POPULAR Computing WEEKLY

Only 50p.

15–21 January 1987

Vol 6 No 3

ADVENTURE GAMES

Pixies, wizards, orcs and trolls

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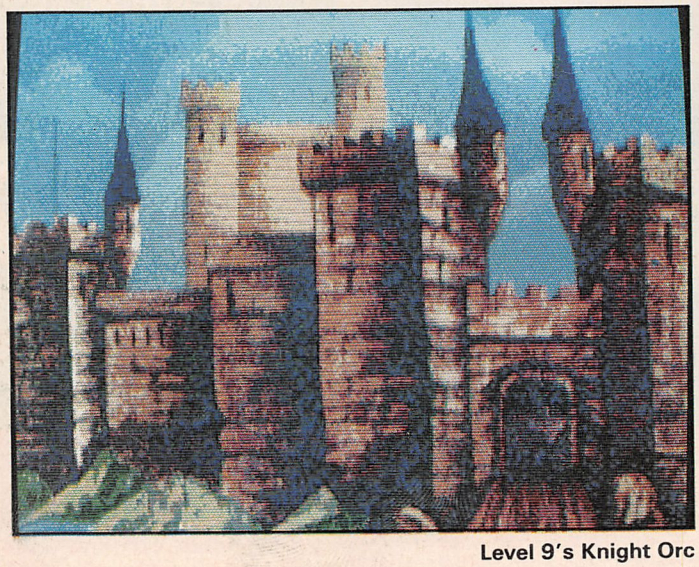
Activision's Borrowed Time

The past and present . . .



Level 9's Knight Orc

. . . and the future

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NEWS DESK

Atari declares war on Amstrad

– Atari launches low-cost PC clone at CES show

Full details inside

STARTS THIS WEEK

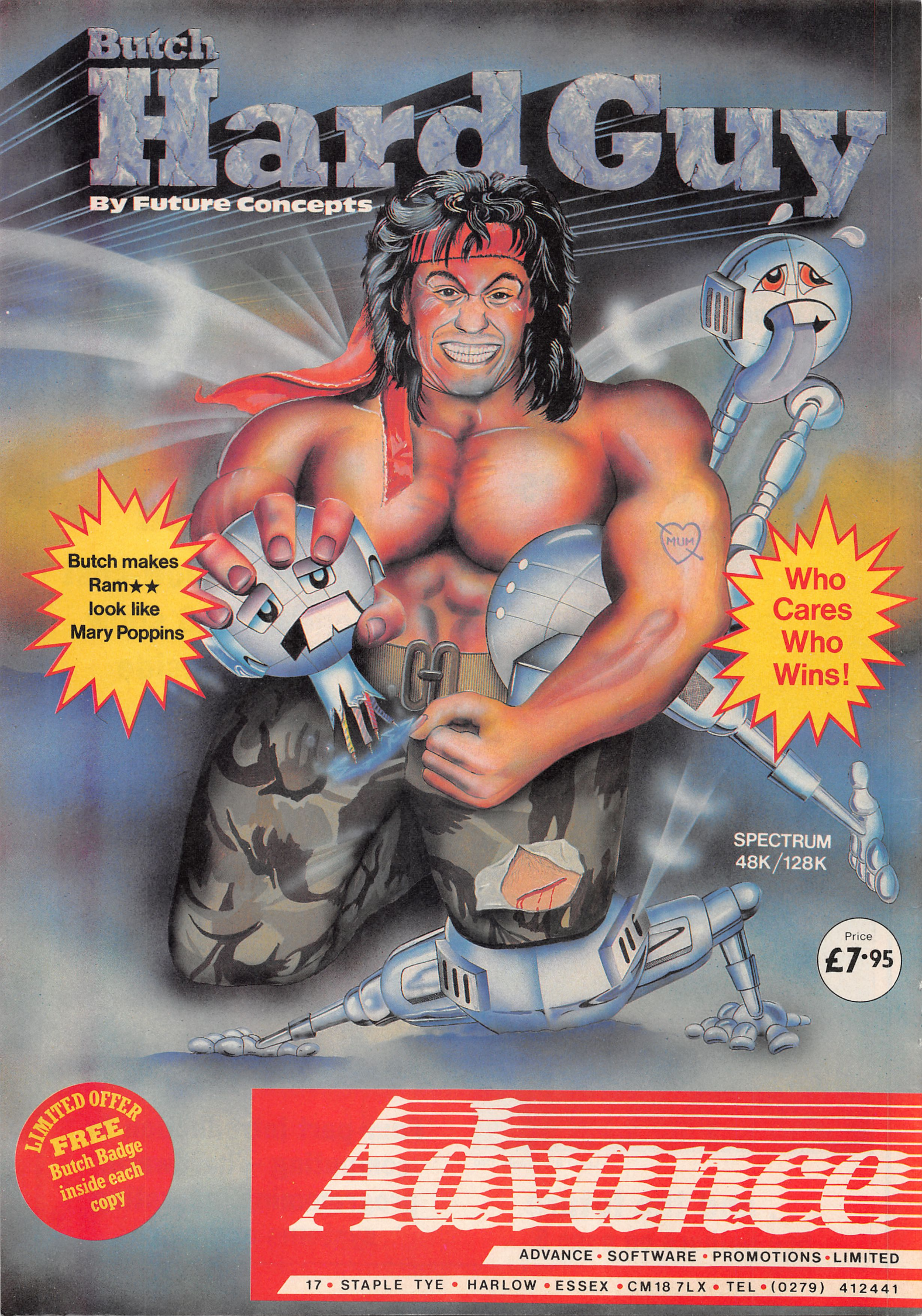
WELCOME TO THE MACHINE

SPECIAL supplement

Four part introduction to computing – hardware, programming, operating systems and more

Butch Hard Guy

By Future Concepts



Advance

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Portable computers have never achieved the success predicted for them. However, Tandy's new portable, the 102, comes in at a mean price of £344, and could break the mould. John Lettice reports.

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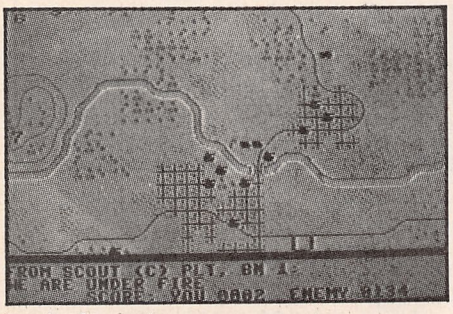

Battalion Commander

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ABC

How to submit articles Articles which are submitted for publication should not be more than 2000 words long. The articles, and any accompanying programs, should be original. It is breaking the law of copyright to copy programs out of other magazines and submit them here – so please do not be tempted. We cannot guarantee to return your programs – so please do not send your only copy. **Accuracy** *Popular Computing Weekly* cannot accept any responsibility for any errors in programs we publish, although we will always try our best to make sure programs work.

Atari launches PC clone Amstrad killer at CES

ATARI returned to the offensive last week with the announcement of a PC compatible, three new STs and a cheap laser printer, stunning the pundits at the Las Vegas CES (Consumer Electronics Show) and reducing the US launch of Amstrad's PC to 'small earthquake, not many hurt' status.

Both the Amstrad and Atari PCs will retail for $799 (about £570) in the States, but Atari has leapfrogged Amstrad by building in IBM Enhanced Graphics Adaptor compatibility to its machine. Like the Amstrad the Atari PC uses an 8086 processor and comes with single $5\frac{1}{4}$ inch drive, 512K Ram, serial and parallel ports and mouse as standard, but for several reasons its compatibility is likely to be a lot higher.

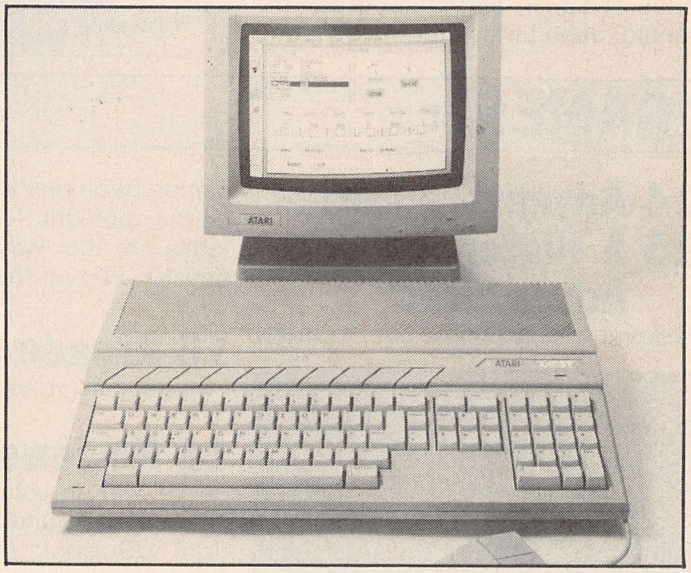
The Atari has a switchable processor, running at the Amstrad's 8MHz or the theoretically more compatible 4,77MHz the IBM PC uses. Amstrad's PC won't run the EGA properly so the Atari will be able to run in high uses its own mouse design and Atari's is compatible with the Microsoft mouse, which is effectively an industry standard. The monitor included in the $799 price is monochrome, but of EGA standard, and as it's also available separately at $200 (about £140) it's incidentally one of the cheapest EGA monitors ever produced.

The Atari PC doesn't have any expansion slots, but Atari is to produce an expansion box for it. It also includes an ST-style hard disc port and has the ability to read either ST or IBM format discs through an external drive.

The new STs are being called the Mega STs, and are the machines first mooted at last year's *PCW* Show (see *Popular,* September 11, 1986). They come as a system unit with built-in 800K drive and detached keyboard, and have a basic 1, 2 or 4Mb memory.

Internal changes to the machines include the addition of a battery-backed realtime clock, space for an extra internal circuit board and radical amendments to the expansion bus. These latter will allow peripherals full access to the machine's 68000 CPU, completely opening up its architecture.

The machines will sell in tandem with the current range of STs, but will be aimed more at the business and specialist market. Prices for the Mega range will start at around $1,000 (around £714). The machines will also be sold as part of a desktop publishing system using Atari's new laser printer. The latter will cost $1,500 (about £1,071) while the cheapest laser printers so far have stuck around the £2,000 mark.



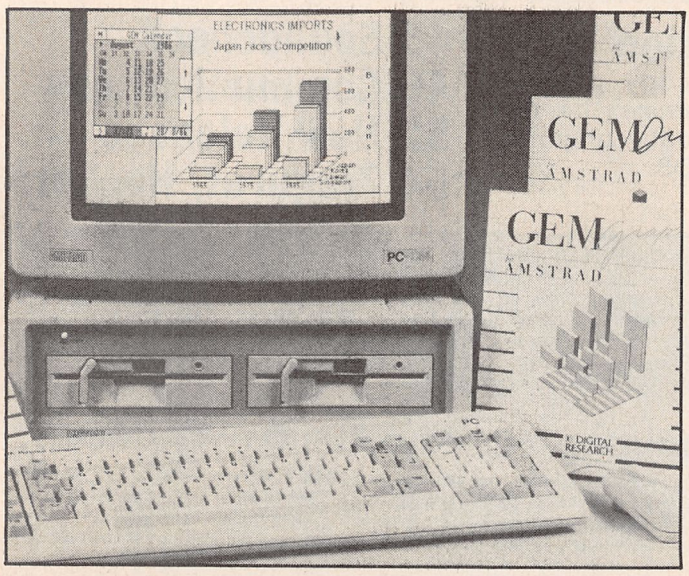
The ST: A growing family

Atari intends to achieve the lower price by stripping out the printer's internal logic and plugging it into the ST through the DMA (Direct Memory Access) port. Price can therefore be kept down by using the ST's internal power, the other advantage being that Atari should be able to sell a lot of STs as dedicated desktop publishing machines.

At the show Atari also announced price cuts on its existing range of STs and the appearance of a slimline 20Mb hard disc for the machines. The 520 now sells there at $300 (about £214), the 1040 for $899 (£642) with mono monitor and $1,099 (£785) with colour.

Simultaneously the company announced UK price cuts effective from February 2. The 520STM is now £259.95, the 520STFM with built-in disc drive £399.95, 520STFM with bundled mono monitor £499.95, 1040 with mono monitor £699.95 and 1040 with colour monitor £899.95.

According to Atari's UK managing director Bob Gleadow the new machines, including the PC, will be in this country by April. Along with the current range and the games console, Atari now claims to cover the micro market from games through home and educational to business. In Europe at least this is precisely what Amstrad sets out to do, and should make the two companies deadly rivals over the next year.



PC: US launch overshadowed

CES: best of the rest

COMMODORE'S efforts at CES were overshadowed to an even greater degree than Amstrad's. Commodore launched a new series of budget PCs, starting with the 512K PC10-1 at £995.

As predicted Mastertronic used CES to launch Ninja and Renegade, the first of its low-cost PC and ST games. Ninja is the obligatory martial arts game, while Renegade is described as a "battle flight simulator featuring non-stop 3D graphic action." Action software is likely to be particularly welcome on the PC.

The Opus Discovery

Opus drive killed off

OPUS' Spectrum disc drive, the Discovery, now seems to be completely dead, with little chance of resurrection. According to Opus the product was discontinued in November, and although a number of attempts have been made to buy the rights to the device these seem to have fallen through.

An Opus spokeswoman was unwilling to comment on whether or not the rights were still for sale, but Opus itself is now out of stock, and it has been suggested that most of the drives the company held have been sold overseas. Few dealers now hold stocks of the drives and some, recognising their rarity value, are increasing their prices.

Colin Hughes of Transform had attempted to buy the rights of the Discovery, but has now abandoned his efforts to concentrate on other fields. "As far as I'm concerned it's dead," he said. The loss of the Discovery, coupled with the recent demise of the Rotronics Wafadrive, means that Spectrum owners will find it even more difficult to get an industry standard storage devices for their machines.

Gauntlet – there is a way out

IN last week's issue we referred to a feature of early 64 versions of US Gold's *Gauntlet,* and suggested that if you got lost while off the screen you would have no alternative but to reload the game. US Gold has asked us to point out that the section of the instructions labelled "Exits" refers to off the screen movement as well.

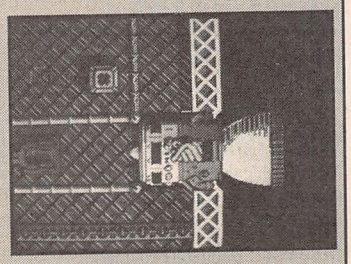
So if you lose track of where you are the off the screen "walls" will disappear after about three minutes and the game can subsequently be resumed.

GAC handbook

INCENTIVE Software has released a 50 page handbook for GAC adventure writers. The GAC Adventure Writers Handbook includes chapters on how to write a good adventure, and costs £1.25.

Details from Incentive Software, 2 Minerva House, Calleva Park, Aldermaston, Berks RG7 4QW (07356 77288).

Software Hotlines



Shadow Skimmer

The observant amongst you will have noticed our cover feature on the history of the adventure game. (For the unobservant, the bad news. We are not *Farmers' Weekly*.) So how about kicking off with some adventure news about Rainbird and Level 9?

Together they will be releasing new three-parter in March, called *Knight Orc.* The scenario sounds refreshingly different – you play an oppressed orc (no, not an Oric). And the task is somehow to get your own back on those human types who've been on your back all these years.

We've not seen the program as yet, but **Level 9** promises high level command structures, a 1,000-odd word vocabulary – and don't those graphics look fabby?

Out on Amiga and Atari ST in March priced at £19.95, with everything else following on afterwards.

Talking of knights, shock news about the most famous knight of all. No, not Gladys – but the *Magic Knight*, created by David Jones and star of those **Mastertronic** games *Finders Keepers, Knight Tyme* and *Spellbound.*

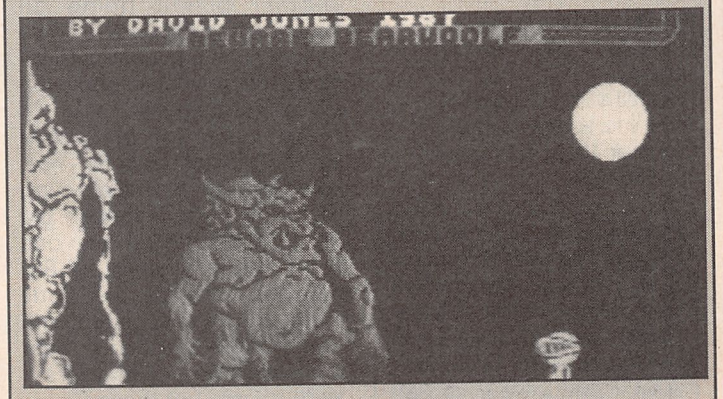
Said shock is that the next one, *Stormbringer,* is going to be MK's last appearance and his hardest, as he must face the awesome power of . . . himself.

Thing is, with all this shifting around in time and space, old MK got trapped in a parallax stream which caused a Magic Knight from a nearby parallel universe to appear here and now – and he's not the goody, goody super hero we've come to know and love, either.

Using the usual menus of nested windows, this'll be hitting the streets on Spectrum soon (there is a 128K version, as well as the 48K). Tony Crowther, that wandering lost soul in the wilderness of freelance programmers has found another home after his brief reunion with **Alligata.** This time he's turned up at **Ariolasoft** putting in some work on *Killer Ring* and *Zarjaz,* two forthcoming attractions from the Long Acre mob. Maybe his mate Jeff Minter put in a good word – he'll be converting *Void Runner* (ex Vic 20) and writing *Hell Gate* for the C16, to be released at £6.95 very soon. Finally, news from **Softek** on the arcade front. John Marshall dropped in to its Covent Garden offices with a demo for a *Uridium* style shoot 'em up – and it was so good they had him signing on the dotted line virtually on the spot. Softek promises "the smoothest, fastest sprites ever seen on a Spectrum."

Called *Shadow Skimmer,* it looks good so far and we'll be able to judge the finished product around end January.

John Cook



Stormbringer

DIARY DATES

FEBRUARY

17–20 February
Which Computer? Show
NEC, Birmingham
Details: Mainly business exhibitors
Price: £5
Organiser: Cahners Exhibitions, 01-891 5051

MARCH

20–22 March
The Electron & BBC Micro User Show
UMIST, Manchester
Details: Software, hardware and peripherals for Acorn's micros
Price: £3 adult, £2 children, £1 discount for advance booking
Organiser: Database Exhibitions, 061-456 8835

APRIL

24–26 April
The Atari Computer Show
Novotel, London W6
Details: First chance for Atari to show off exciting new strategy
Price: £3 adult, £2 children, £1 discount for advance booking
Organiser: Database Exhibitions, 061-456 8835

MAY

9–10 May
The Electron & BBC Micro User Show
New Horticultural Hall, London
Details: Software, hardware and peripherals for Acorn's micros
Price: £3 adult, £2 children, £1 discount for advance booking
Organiser: Database Exhibitions, 061-456 8835

JUNE

12–14 June
The Commodore Computer Show
Novotel, London W6
Details: Software, hardware and peripherals for Commodore range of machines
Price: £3 adult, £2 children, £1 discount for advance booking
Organiser: Database Exhibitions, 061-456 8835

Prices, dates and venues of shows can vary, and you are therefore strongly advised to check with the show organiser before attending. *Popular Computing Weekly* cannot accept responsibility for any alterations to show arrangements made by the organiser.

Yellow Pages get online database

VOICE and data communications moved a little closer together earlier this week with the launch of BT's Electronic Yellow Pages service. This is intended to provide an on-line Yellow Pages directory, and initially covers London, Reading, Guildford, Watford and St Albans, but it's to be extended to the rest of the country in the near future.

The service is available free of charge and can be accessed at baud rates of 300/300, 1200/1200 and 1200/75, or through a Prestel gateway. Advertisers in the current Yellow Pages can go onto the database free of charge, although so far only 25 per cent have said they wish to do so.

Eventually all printed Yellow Pages directories will carry the local database number and an access code, but meanwhile details on local services can be obtained from EYP on 0734 506259.

The new Phasor

Britannia takes shot at pistol-grip joystick

THE Phasor One is a new pistol-grip joystick from Britannia Software. Like Mastertronic's Magnum, the Phasor has the fire button mounted on the grip and the joystick on top, allowing it to be used by both right and left handed players. It comes with an extra-long cable, and costs £12.95.

Details from Britannia Software, Unit M28, Cardiff Workshops, Lewis Road, Cardiff CF1 5ED (0222 481135).

Panasonic printers

FIRST SOFTWARE has added two new Panasonic daisywheel printers to its range. The KX-P3131 is a 110 column machine that prints at 17 cps, while the larger 182 column KX-P3151 prints at 22 cps.

Both machines can print on single sheet, continuous stationery and multi-part forms and feature logic seeking, parallel interface and bi-directional print head as standard. A margin/justification control switch is also incorporated, and serial interface, tractor feed and automatic sheet feeder are available as extras.

Details from First Software, Intec 1, Wade Road, Basingstoke (0256 463344).

Qualitas launched for 6128

SEVEN Stars Publishing's Qualitas utility is now available for the Amstrad CPC 6128, price £12.95. The program allows NLQ output to be produced on ordinary cut matrix printers with the aid of Tasword and Protext. Seven Stars intends to supply add-on font packs.

Details from Seven Stars Publishing, 34 Squirrel Rise, Marlow, Bucks SL7 3PN (06284 3445).

Footnotes

MATTERS at Vic Towers may be somewhat improved of late, but Commodore is still unlikely to welcome yet another pundit going on about "struggling" companies, "savage cost cutting, mass redundancies, and even a closing down sale . . ."

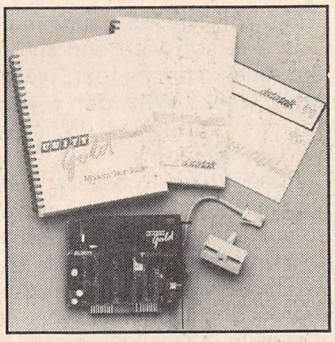
The author of the above savage indictment is not, however, some cynical young hack making a desperate bid for a Pulitzer Prize, but one Peter Calver, director of Supersoft, "one of the firms most closely associated with Commodore products over the last eight or nine years". With friends like these . . .

What would you say our picture showed? One of Sir Clive's wafers? A faulty 8 inch disc? A dispute over frisbee ownership? No, the hands in question belong to ICI chairman Sir John Harvey-Jones and Konix boss Wyn Holloway. Wyn is being awarded a prize for selling joysticks and the prize is . . . a big beermat or something.

"Psstt – wanna buy a hubcap?"

Some of the public relations agencies in this country tend to go over the top, but in the US it's a whole different ball game, as Jeri Cohen, of G S Schwartz & Co of One Madison Avenue, reveals.

Gil Freeman has "turned Epyx into one of the hottest bets in town", runs "a lean and mean operation", and has got "the Midas touch". Pausing only to imply that the opposition is peopled largely by disco-crazed dope-heads (well we think that's what she means) Jeri then proceeds to offer to allow us to talk to this awesome talent. We'd love to Jeri, but feel we're not worthy to lick the man's disc labels . . .



New card modem pack for the PC

DACOM Systems has launched a combined modem and communications software package for the IBM PC and compatibles. The package, Unity Gold, consists of triple standard half-card modem, *Datatalk* communications software and two way telephone connector and documentation.

The modem supports V21, V22 and V23 standards along with autodial, autoanswer and Hayes compatibility. It will provide baud rates up to 1200/1200.

The full package costs £459.

Details from Dacom Systems, 26–27 Heathfield, Stacey Bushes, Milton Keynes MK12 6HR (0908 322322).

Graphics Rom for BBC launched

THE Realtime Graphics System is a 32K graphics Rom for the BBC micro, and can handle both picture drawing and 3D wireframe objects. The system works through a series of menus and includes an interactive editor for creating and editing models, a view option allowing 3D objects to be manipulated at any time during design, a profile option which allows curves to be created by rotating objects and a 3D macro facility, which allows designs to be used as basic building blocks. The system costs £79.95.

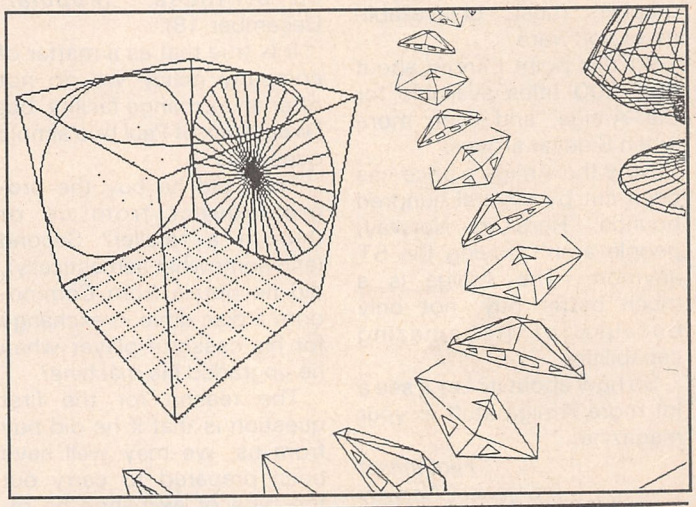
Details from Silicon Visions, 47 Dudley Gardens, Harrow, Middx HA2 0DQ (01-422 2274).

Supersoft Micro Assembler moves over to C16

SUPERSOFT'S *Micro Assembler,* which was one of the best-selling products for the Commodore 64, is now available for the Plus 4 and C16. Although the 64 version of the product came on cartridge the new version comes on tape (£12.95) or disc (£14.95).

On the C16 the program saves memory by dynamically allocating the space for source code, object code and labels, and short source files can be linked on tape or disc to provide longer programs. On the Plus 4 or a C16 with expanded memory the assembler can handle considerably more code than is possible on a Commodore 64.

Details from Supersoft, Winchester House, Canning Road, Wealdstone, Harrow, Middx HA3 7SJ (01-861 1166).



ROMANTIC ROBOT present

multiface one & two

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MULTIFACE 1&2 must rank as the most useful multi-purpose interfaces for SPECTRUM or AMSTRAD. They enable you to stop ANY program at ANY point and SAVE it onto ANY media – disk, tape, cartridge, wafer. They have a unique MULTI TOOLKIT to study/modify programs – you can PEEK/POKE every single byte in AMSTRAD/SPECTRUM incl. Z80 registers, customise programs, put in infinite lives, open a window and see/edit – with full on-screen editing – whole blocks of RAM in Decimal, Hex or even ASCII (to reveal any text in programs), etc.

Each MULTIFACE has an 8K ROM & 8K RAM, needs NO additional software, takes NO part of AMSTRAD/SPECTRUM RAM, is FULLY AUTOMATIC and 100% reliable – all you have to do is 1)press the MULTIFACE button 2)select a function – Return to program, Save, Toolkit, Jump to an address instead of returning, Copy to printer (Spectrum only) 3)input a name for saving 4)select saving destination – Tape, Disk, etc. and choose to save Program or Screen only.

MULTIFACE 1 is the ONLY product that can put literally anything onto anything – Tape, Microdrive, Wafadrive, Discovery, Beta or Kempston. Similarly MULTIFACE 2 is the ONLY device capable of saving any program PROPERLY and AUTOMATICALLY incl. screen, colours and sound !!! Both MULTIFACES are menu-driven with on-screen prompts and instructions, user-friendly, fully error-trapped/idiot-proof, 1st class professional products with a full money-back guarantee.

MULTIFACE 1 also gives you a joystick interface (Kempston compatible) plus a switch to make it invisible whilst MULTIFACE 2 has a RESET button instead. Both have a through extension bus for connecting other peripherals. They use powerful & efficient compressing for fast re-loading and taking minimal room on disk, tape etc. – using MULTIFACE 2, for instance, 64 K programs usually load in approx 20 seconds from disk and 5 minutes from tape (when saved at hyper speed).

Programs saved with MULTIFACE ONE can RUN independently.

Please state if using KEMPSTON disc interface on Spectrum.

AMSTRAD 464, 664, 6128 £46.95 two

Nº1 MULTIPURPOSE INTERFACES FOR AMSTRAD & SPECTRUM

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A ghost town stands in the way of motorway M87 and only STEEPLEJACK can demolish it with his drill and oversized pair of lead boots in this highly fresh, original, and stylish arcade game. STEEPLEJACK must be very fast, crafty, alert and strong – there is a whole army of creatures and features one can only find in a ghost town, so much to do, so little time left...

NEVER MIND THE NASTIES

NMTN contains the same unique humour and addictivity as its older brother, the hit game WRIGGLER. The action takes place in a weird and bizzarre world full of mutants and monsters, dungeons and sewers, convevor belts and express elevators, deserts and pyramids, trampolines and space stations, a world that must be explored and fought through to prevent a total annihilation of human race.

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Complete Spectrum music system for writing, editing, playing, printing & storing music with real notation graphics.

TRANS-EXPRESS

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Address.....

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SELENE & ANACHRONISM	£ 9.95 ☐	STEEPLEJACK	£ 4.95 ☐
NEVER MIND... Amstrad	£ 9.95 ☐	or disk version	£ 14.95 ☐
MUSIC TYPEWRITER	£ 7.95 ☐	WRIGGLER Spectrum	£ 2.95 ☐
WRIGGLER Amstrad tape	£ 7.95 ☐	or disk version	£ 11.95 ☐
TRANS-EXPRESS cartridge ☐	disk ☐	wafer ☐	£9.95 ea

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Letters

Let's hear it for the Amiga

I recently moved up from a Commodore 128 to an Amiga because I think the 8-bit computers are getting a bit dated.

To get to the point: why do you only write about the Atari ST and almost never about the (much better) Amiga.

Since these two machines arrived you've been concentrating on the ST. Why? The Amiga is better on all points – graphics, music, or availability of software.

At this point I know about 400–500 titles available for the Amiga, and even more when Sidecar arrives.

Now the Amiga's price has been cut by several hundred pounds. Here in Norway, people aren't buying the ST anymore. The Amiga is a much better buy, not only because of its amazing capabilities.

So how about it? Let's see a lot more Amiga stuff in your magazine.

Førn Innset
Skjetten, Norway

It might be like that in Norway, but in the UK it just isn't so. The ST is outselling the Amiga by a very wide margin. The Amiga is still much more expensive than the ST, and the ST has much the larger software base.

Not enough words

Help! I'm writing a word puzzle program for the Atari ST and I need a big list of English words. I've tried a couple of spell checkers, but they've not really got enough words.

Anybody know where I can get such a list? It doesn't have to be for the ST.

Jeff Hosier
Vernham Street
Hants

The other side of disc upgrades

I am writing in response to the Star Letter from Paul Nash headlined "Mule-headed attitudes" (*Popular*, December 18).

It is true that as a matter of company policy we do not offer an exchange facility, but I would ask of Paul two simple questions.

First, did he buy the program direct from us or through a retailer? Second (and somewhat sarcastically), did he obtain from Commodore a disc drive in exchange for his cassette player when he upgraded his machine?

The reason for the first question is that if he did buy from us, we may well have been prepared to carry out the type of exchange he requested since the initial contract would be between us and Paul.

However, if he purchased the program from a retailer the contract is between Paul and them, and he should have contacted them with regard to the exchange.

The reason for the second question is somewhat obvious, in that if you extend this principle to its logical conclusion, thousands of customers would be continually trying to trade-in old products for new ones.

Maybe this would be a good idea in the future in some industries, but would be completely unsuitable for a company in this industry to adopt as a general policy.

For this reason I totally disagree with *Popular's* comments at the end of the letter.

Frank Brunger
Marketing and sales director
Ariolasoft UK

As copyright holders, it is for Ariolasoft alone to offer an upgrade service. And your comments about other forms of replacement are a red herring. The point about tape to disc upgrades is that you would not be offering an improved product, merely the same software on a different medium.

Disgusted, Somerset

I am writing with absolute disgust concerning your write-ups on Konami (Reviews, January 1). *Jail Break* on the Amstrad is no way its first game on home computers.

What about the MSX? Why, it's only got 20 or so titles out for that machine. And games like *Yie Ar Kung Fu 2, Nemesis* and *Green Beret* outclass all equivalents on the other three computers.

MSX is getting big and you know it, but pride won't let you admit because if you do then you've lost. You've lost a two-year battle, where you've said it's not worth it and there's no software.

But why has MSX survived? There is software and there are titles coming out week after week. Why don't you tell us about it? What's wrong, scared?

I find it hard to believe that you can't get software news or copies for reviewing. *I* can and my club magazine, *MSextra,* has under one hundredth of your circulation. So what is it with you? You just don't like it?

You make me sick.

Mark Smith
Wellington
Somerset

More Memotech, please

When are we going to see more articles on Memotech computers? There is a growing number of these machines on the market and I feel sure that when people get to know that you have articles on them they will start to buy your magazine, and soon send programs and articles in for you to publish.

Chris Seymour
Accrington

Keep your eyes peeled, Chris; we'll have a Memotech listing in the programming pages in the next couple of weeks or so.

Sunday supplement

Could I draw the attention of your readers to the Southampton Microcomputer Users' Group? We are looking for members before opening in March.

People interested should

Puzzle

Puzzle No 241

The 'Screamin' Sisters' new single is making its way up the pop charts. As is usual, the running time of each of the sides (in minutes and seconds) is printed on the label. By finding the sum of these two times we can calculate the total running time of both tracks. Each of these timings consists of three digits, one digit denoting the minutes and two digits denoting the seconds.

The nine digits so produced are all different and do not include zero. So, for example, they may have been

6:28 + 3:17 = 9:45

However, the timings are such that the total combined running time of the two sides is the *shortest* that is possible under these conditions. Can you say what this total running time is?

Solution to Puzzle No 236

Answer: Apart from the example given, there are two other five-digit values which equal the sum of each digit raised to the fifth power. These are 54748 and 93084.

The program uses five *For/Next* loops (one for each digit in the number) to generate all possible values. Line 60 calculates the number so formed, and line 70 the sum of the fifth powers. If these two values are equal the numbers are printed out.

Note that in computing the sum of the powers the value is found using direct multiplication rather than by using the computer's 'power' function.

```
10 FOR A=1 TO 9
20 FOR B=0 TO 9
30 FOR C=0 TO 9
40 FOR D=0 TO 9
50 FOR E=0 TO 9
60 N=A*10000+B*1000+C*100+D*10+E
70 P=A*A*A*A*A+B*B*B*B*B+C*C*C*C*C+
   D*D*D*D*D+E*E*E*E*E
80 IF N=P THEN PRINT A;B;C;D;E
90 NEXT:NEXT:NEXT:NEXT:NEXT
```

Winner of Puzzle No 236

The winner this week is John Consadine of Swanland, N Humberside, who will be receiving £10.

Rules

The closing date for Puzzle 241 is February 1st. Answers should include a program listing if possible.

live in or near the Southampton area and should be owners of Acorn, Amstrad, Atari or Commodore micros. We would prefer applicants to be at least 16 years old.

As it stands, we plan to hold meetings on the first and third Sundays of each month.

If you are interested then write to me at 14 Hobart Drive, Hythe, Southampton SO4 6FH, stating which micro you use. I will then send more information and an application form.

Iain Campbell
Southampton

Enterprise group on the move

I write to you with regard to the letter from S Perrin in *Popular,* January 1.

The Independent Enterprise Users Group has moved house once again. Its new address is PO Box 13, Crowborough, East Sussex TN6 1QX.

A hotline service is available Monday–Saturday 7pm to 10pm and on Sundays from 2pm to 10pm. The number is 08926 3890.

Software is available from Boxsoft, 12 White Gates, 100 Station Road, New Barnet, Herts EN5 1QB.

It may be of interest to Enterprise owners that there is a Sinclair emulation unit almost ready which will allow Sinclair software to be run on the Enterprise.

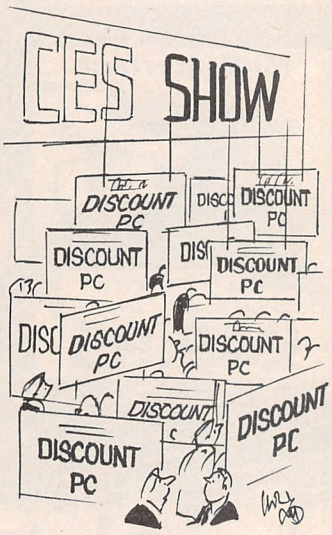
M Gillespie
London E10

Free modems clarified

Further article on Micronet's MUG *Shades* in the January 1 issue, of *Popular.*

To avoid any disappointment or misconception to your readers, I would like to clarify the facts as regards Micronet's free modem offer.

Micronet give free modems to any new subscriber joining Micronet and Prestel for one year. The cost of an annual subscription is £66. Please note that it is only BBC and Spectrum micro owners who also gain free comms software, for all other compatible micros, software has to be purchased separately by the customer.



"Which one's the Amstrad PC?"

For those customers whose micro is not compatible with the modems offered, please contact Micronet on 01-278 3143 for a list of recommended suppliers.

Please also note, that the quarterly subscription to Micronet and Prestel is in fact £16.50 per quarter, and not £26.50 as printed.

Lyn Bennett
Marketing Manager
Micronet 800

No fast loads?

I was obviously delighted to receive for Christmas a 1571 disc drive for my Commodore 128 but my delight came to an abrupt end when I was told, by an independent computer shop, that the 1571 cannot load 'fast load' programs whereas the 1541 can.

I mentioned that the 1571 has a 1541 mode but was told they would not load in

continued on page 11 ▶

Clearing the air with the puzzle

The puzzle section has been attracting an above average amount of correspondence recently, mainly from people confused as to whether they must find a unique answer to each problem set, or concerned about our methods of judging the winners.

The puzzles which caused the most problems were numbers 232 (puzzle set November 6; solution December 11) and 237 (set December 11) – see Letters, January 1. J Frank Hughes was not our only correspondent on the subject.

Gordon Lee, our puzzle compiler, has responded with a full and detailed solution to Puzzle 232 and a clarification on 237 to clear the air on this one:

"I must reply to the letter from J Frank Hughes (January 1) regarding the two recent puzzles in which he claims to have found more than one solution. In the cases that he quotes I must point out that there is but *one* solution to each!

Puzzle 232: Using the mathematical data alone there are a number of possible solutions, but included in the puzzle is a carefully worded statement designed to eliminate all but one of them. This is: 'Your number only contains one of the digits in my number – but it *is* in the correct position.'

This contains in effect *two* statements, ie, 1) You have only one digit correct, and 2) It is correctly placed.

This is not the same as the simpler 'You have only one number correctly placed', which I venture to suggest was the interpretation put on it by Mr Hughes. Consequently, the two extra solutions that he gives (2716 and 5719) can be eliminated as both contain two numbers in common with the guess! This leaves just the one solution (4718).

Puzzle 237: Again there are a number of possible solutions relying on the total number of chimes alone – but, as with puzzle 232 there is a clue included which is designed to eliminate all but one of them. This is found in the final sentence which states 'If you knew the length of my visit you could work out my times of arrival and departure . . .'

If the difference is taken of each of the pairs of arrival and departure times the length of each possible visit will be found. If these are listed *all of them except for one* will be duplicated on the list at least once. Consequently, only if it was this difference that was made known would a unique solution be possible, therefore this was the length of the visit in question!

Finally, as regards my listing which apparently did not provide the solution to puzzle 232, the listing, at least from my copy of *Popular,* works perfectly (on a BBC B). I can only suggest that Mr Hughes' micro has a slightly different operating system – most likely one which puts a leading space into a string when converting from a numeric variable. For example *X=1234 : X$=STR$(X) : Print Len(X$)* will give *5* rather than the expected *4.*"

Puzzle rules

To help try to eradicate problems with queries over puzzle solutions, we have stopped asking for answers on a postcard, and reinstated the system where we need to see written listings of the programs you use to solve the puzzle. This, of course, makes it easier for us to check your workings against Gordon Lee's.

However, P J Thornthwaite of Bexleyheath comments that this "eliminates those of us who are not so familiar with computers". Not at all. If you solve a puzzle without using a computer program, then do show us how you did it. It's just that the most sensible way to solve the vast majority of the puzzles will be with the computer.

Finally, on judging the puzzle. The winners do not 'come out of a hat', as not all entrants will submit correct answers or take all the factors of the problem into account (cf Puzzle 235, where not everyone appreciated that decimal coinage was a fairly recent phenomenon).

Once the wholly correct solutions have been picked out, obviously there will then be a 'lucky dip', if more than one person has got it completely right.

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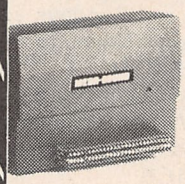

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◀ continued from page 9

this mode either.

I was strongly recommended to replace my 1571 with a 1541c.

Is what I have been told true, and if so what should I do about it?

Ivan Wilson
London SW2

So far as we're aware, the only "fast load" program that won't work with the 1571 is Firebird's *Elite*. Otherwise you should have no trouble.

Cheap prints

Could anyone suggest to me a cheap printer to use on the Amstrad 6128?

If anyone would like to write to me concerning the Amstrad to exchange ideas, etc, then write to the following address, enclosing a photo and a brief description of yourself.

Stephen Chandler
22A Normans Road
Canvey Island
Essex

Chess – the tournament goes on

The *Popular* Readers vs *Colossus* tournament is back after its Christmas break, and preparing to go weekly.

From now on, we'll take one game per week, starting with Game One (with the Readers playing Black) this week. Next week we'll print the next stage in Game Two (Readers playing White).

Remember, it needn't cost you anything extra to play each week, if you send in your entry promptly, using the Freepost address, given below. Late entrants are still advised to use a stamp, for speed.

In Game One, the Readers' votes over Christmas went for advancing the central pawn further (for details see the diagram). *Colossus* has responded by moving the threatened knight.

Up to you again

Send your suggested next move for the Reader's side to either Inter Mediates (*Popular* Chess), Freepost, Sawbridgeworth, Herts CM21 9YA (no stamp needed) or *Popular* Chess, Unit 2, The Maltings, Sawbridgeworth, Herts CM21 0PG (with a stamp). One entry per person only, please. The closing date for entries is Wednesday, January 21. Next week, se'll have a progress report on Game Two, and Martin Bryant's computer chess column returns.

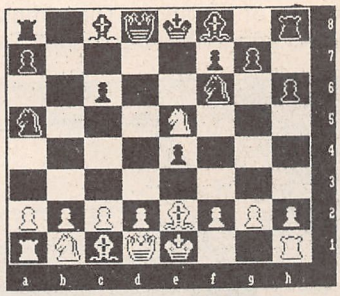
Game One

The moves so far:

1	Pe2–e4	Pe7–e5
2	Ng1–f3	Nb8–c6
3	Bf1–c4	Ng8–f6
4	Nf3–g5	Pd7–d5
5	Pe4xd5	Nc6–a5
6	Bc4–b5+	Pc7–c6
7	Pd5xc6	Pb7xc6
8	Bb5–e2	Ph7–h6
9	Ng5–f3	Pe5–e4
10	Nf3–e5	?

Prizes

A British Museum reproduction Arran chess set goes to the person suggesting the most selected moves at the end of the game. Five copies of CDS's *Colossus Chess* (available for most machines) go to runners-up. The games are by no means over yet, so it's not too late to start if you haven't taken part before.



Win Brian Clough

Brian Clough's Football Fortunes, from CDS, is a soccer management game with a difference. It's a board game, with the computer making all the necessary league calculations and judging your seasonal performance.

Up to five players can take part as rival managers, playing in both league and FA Cup matches, buying, selling and loaning players along the way.

Brian Clough's Football Fortunes is being released this week for most popular micros at £14.95 on tape and £17.95 on disc. However, you have a chance of winning a copy signed by Brian Clough himself in this competition.

How to enter

Study the photograph (left), showing some CDS representatives talking to Cloughie on some of the game's finer points.

Just what is being said here? Ten copies of the game will go to the entrants submitting the most apt or amusing captions (nothing rude or lewd), with the signed copy going to the very best.

Send in your caption idea on the coupon below, or a copy if you don't want to cut up the magazine.

Entry conditions

Entries should be sent to: BCFF competition, *Popular Computing Weekly,* 12-13 Little Newport St, London WC2H 7PP, and should reach us by Thursday, February 5. Winners names will be published in *Popular,* February 19. One entry per person please, the judges' decision is final and all normal competition rules apply.

Name.....
Address .....
.....
.....
.....
My caption is (not more than 20 words) .....
.....
.....
.....
.....
.....
If I win, I would like a copy of *Brian Clough's Football Fortunes* for Spectrum tape ☐; Commodore 64 tape ☐ disc ☐; Amstrad CPCs tape ☐ disc ☐; BBC B tape ☐ disc ☐; Amstrad PCW8256/8512 disc ☐.

Portable power

John Lettice tries out Tandy's 102 portable computer, cheaper than many at under £350

Thanks to a combination of low power, high pricing and dismal marketing, portable computing is now entering its fourth year of relative obscurity in this country.

Epson's HX20 had been launched earlier, but it was the appearance of Tandy's Model 100 in 1983 that established the first of the two basic blueprints for portables.

The second type is bigger, heavier, more expensive and the sort of machine the US army equips its armoured divisions with. We don't want to concern ourselves with that sort of thing here.

Within these two divisions there is a wealth of variation. The simplest portable computers (including the Tandy 102 reviewed here) are A4 sized, battery powered units that are about as close to an electronic notepad as you can get using current technology. As you progress further up the scale the machines get closer and closer to desktop computer equivalents.

Readable display

To rival a desktop machine a portable needs disc drives and a screen of size and legibility equivalent to a monitor. Drives bump up weight and size, while in order to produce an 80x25 display that's readable, a portable needs a big screen that is either backlit LCD (LCD screens normally use ambient light, so the smaller the characters the more need there is for a built-in light source) or gas plasma (a variation on neon). Both of these draw more power, so either decrease endurance or increase battery weight.

So although the 102 and its predecessor the 100 are less powerful than many other portables, they're arguably more portable and more versatile.

The model 100 was, like its sister machines the NEC 8201A and Olivetti M10, based on a design by the Japanese company Kyocera. The machine had 8-32K CMOS Ram (CMOS draws a fraction of the power of normal Ram for a small speed trade-off), full-size keyboard, 40x8 LCD screen and Centronics and RS232 interfaces. The machine had built-in address book, word processing and telecommunications software, so although it could only handle tape storage it was highly mobile – just add four AA batteries and for 14 hours you could tap away wherever you wanted.

Modem unapproved

The Model 102 is the 100's direct successor, and tackles two of the latter's disadvantages. First of all it costs only £344 for a 32K machine, so if you add a printer the cost is comparable to an Amstrad PCW, and second it has a built-in modem. The modem is the product of long and tearful discussions between Tandy and BABT (British Approvals Board for Telecommunications), which vets all modems used in this country.

It's perfectly possible to build a modem on to a micro's circuit board, and if you do this, as Tandy has, the extra production costs are marginal. However, the modem is unapproved for use on the telephone exchange in the UK, despite Tandy's long experience in communications.

So naturally I couldn't test the modem here, but a quick trip to Holland (that's my story and I'm sticking to it) revealed a reliable 300/300 device. The 102's Telcom program uses simple codes to set use of internal or external modem and various comms parameters, and these are always displayed when you enter the program. The internal assumes 300 baud, but if you're using an external modem you can run it at anything from 75 to 19200 baud.

Telcom's terminal mode allows you to upload and download files straight from the 102's Ram, and also has an echo toggle that gives you an automatic printout of what's going on on the screen. A reliable program of Telcom's stamp is actually very important for a machine like this, as it's sensible to use other micros or mainframe electronic mail services for at least part of your storage.

Of the other programs, *Address, Text* and *Schedl,* you can probably only reasonably expect to use one, given the limitations of the machine's memory. *Text,* the one that's likely to get the most use, is a simple but effective word processor that needs little if any learning, and only falls down when it comes to printing out. The 102 has a print key that will dump the screen on its own and print out the entire document if combined with shift.

Portable drives

To use it properly as a word processor you really need to buy a print formatting program, but with a bit of effort you can get hold of these.

The files from the word processor, along with Basic programs, are stored in the machine's Ram, even when the machine is switched off, so it's actually quite difficult to lose a document.

The other programs built-in are an address manager and a diary program. These are also simple to use, but the Ram isn't really big enough for you to use them to the full and use the word processor as well.

The machine's basic storage method is tape, but it's possible to get portable drives for it.

Expansion facilities are fairly thin on the ground, although Tandy is currently considering what it should bring in from the US for it. The machine has an expansion bus round the back, and also two free chip sockets in a hatch underneath. One of these is standard size, and should take normal Roms, while the other is an improbably large beast. I surmise that the latter could be used for the likes of Travelling Software's 32K suite of Rom-based applications.

Verdict

If I didn't already have a portable I'd find the 102 almost impossible to resist. Larger portables don't have the problems of low memory and cramped screen, but their problem is that they're too big. The Tandy is light, reasonably cheap and, with the addition of a crate of ice cold beer, is ideal for those heady summer days in the garden.

You can't do that with an Amstrad . . .

Micro *Tandy Model 102* **Price** £344
Supplier Tandy Corporation, Bilston Road, Wednesbury, West Midlands WS10 7JN.

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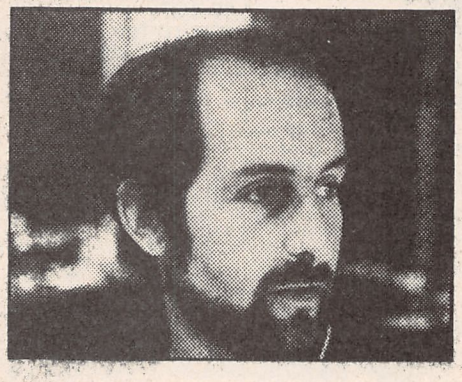

Taking the bulls by the horns

Tony Bridge casts his eye over Flook Two, from the Quill of David Oya, and Operation Stallion from Wrightchoice

We had a whole bundle of entries for the Level 9 Year Planner competition that we ran just before Christmas – Level 9 tells me that there are those who believe that it wrote such classics as *Lords of Midnight* and *Heavy on the Magick!* However, most entrants got the questions correct, and 50 of the planners should be with their new owners now.

I haven't got room for the complete list of winners, but there are several names that I recognise, including David Oya's. I looked at his adventure *Flook One* a few weeks ago, and found it to be a well-written humorous story with a lot of interesting puzzles. Nothing too arduous, but it's a good introduction to the art of adventuring. That was written for the Amstrad, but the Spectrum and Commodore versions are well on the way.

And so too is Part Two. Again, it is first released on the Amstrad and is written with the venerable aid of *The Quill.* Before I got stuck in the obligatory maze (not my favourite adventure device, and although you are given fair warning about its whereabouts, I gave it a wide berth as usual until I had explored every other possible location), I found about a dozen or so places to visit. David carries on the tradition started in the first *Flook* and gives adequate help throughout the adventure in the use of objects. This is what gives this and the first episode their appeal for beginners – although many of the objects seem rather useless at first (there's even a "thingy" which "seems of little use"), you can be sure that they will be needed sooner or later (except Pedro the Flea, who seems quite content to sit there nibbling!).

Weird logic

Once again, Oya employs some pretty weird logic, and the player must suspend disbelief in the ridiculous for a while; for example, I managed to milk a bull and then climbed a totem pole in order to become "enlightened".

The flea and the rat who were with me also became enlightened, and this turned out later to be of great interest to the animal agent who happened to be on the lookout for an original speciality act.

The responses and vocabulary are a touch above the usual "I don't understand that" and make for a rather more interesting and atmospheric adventure than usual, even though the puzzles won't keep hardened players perplexed for too long.

Well, it's all good fun and a good way to spend a few hours – David hasn't told me how much the adventure will be, but Part One was £1.75 for tape or just £1.75 plus formatted disc. Can't be bad, eh? Pester David at 24 Kingsway, Banbury, Oxon OX16 9NY. And Wally Fawkes, for anyone who's interested, is a jazz clarinettist turned cartoonist who used to write a weekly strip in *The Observer* with George Melly (I think). I never actually followed the series, which was about a little furry creature called, of course, Flook (though David tells me that this wasn't the inspiration for his stories).

Chunky characters

Now to another competition; Wrightchoice Software is offering a cool £500 to the first adventurer who completes its trilogy of adventures for the Spectrum.

The first in the series is *Operation Stallion,* a two-parter. The general presentation of the game is good, with a nice chunky character set, Ram save, good short descriptions and extremely well-drawn pictures, at least in the first part, which is really a scene-setter. Your mission here is to get to keep an appointment with your boss, who will then offer you a bewildering choice of some 24 weapons to take forward into the next part, and your confrontation with the drugs baron, Chow King Kwok.

This second part seems, at the start anyway, to be without graphics, for now we get down to the serious business of trying to find a way into the forbidding Scottish hideout of the evil Kwok. There's an angry bull (and the rope that I had brought along with me didn't seem to do any good) and a sentry guarding the front gate. All pretty hackneyed situations, similar to dozens of other adventures.

Well, I suppose not every adventure can be like those from Infocom, Level 9 or Magnetic Scrolls and push forward the limits of programming. However, the price *should* reflect this state of affairs, and I think £6.95 is just a shade steep, considering (I know I've said this before!) the sort of adventures that are available for a lot less. Still, there is that £500 prize, which must be paid for somehow.

Success depends of course on what you have chosen to take with you from the introductory first part and this is where a disc-based adventure would score over the tape-based one. There would be no need for such an irrevocable choice to be made.

Most of the time, the adventure works well, except when I tried to load my magnum. Yes, you've guessed, the program asked me to "load in saved game, please"! This can all get a bit tedious, but if you want £500 bad enough (don't we all?), then you'll persevere. As a starter (and because I've been barred from taking part in this particular competition, I don't mind giving you all a bit of a head start!), try searching your pocket and then examining your keyring.

Wrightchoice Software, PO Box 100, 159 Welbeck Crescent, Troon, Ayrshire KA10 6BD (Tel 0292 311916).

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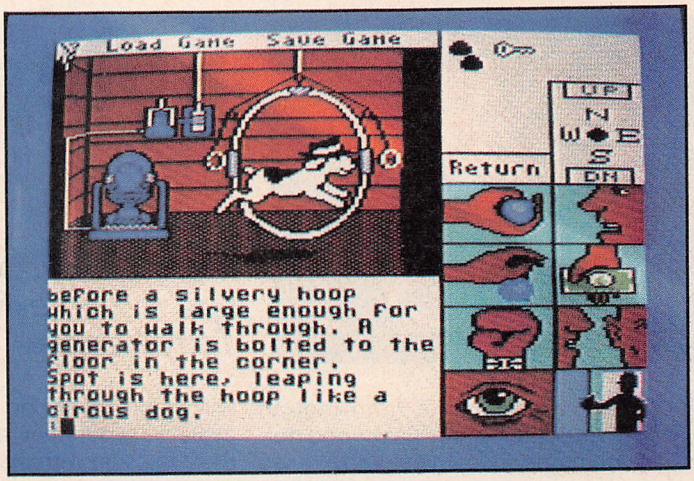
Wizards and orcs of old

Following our feature on strategy games two weeks ago Ian Bruce summarises the development of adventures to the present day



Tass Times in Tonetown **employs one of the most original scenarios for an adventure – an alternative dimension in which the whole world looks and behaves like an exclusive New York nightclub. Your quest is to find your old friend Gramps – and to stay alive long enough to return home**

The world of adventure games is a dimension in which you can be anyone, go anywhere and do anything, ruled by fantasy and imagination.

It all began in a cellar in the early 1970's – a couple of experienced wargamers began replacing their soldiers with orcs, their weapons with magical spells, and eventually most of the action took place not on the board, but within the imagination of the player. This newly discovered fantasy-wargame was gradually amended so that finally no soldiers or orcs were needed at all – all the action took place in the mind!

This led to the production of a game which would have literally scores of imitators – I am speaking, of course, of the famous *Dungeons & Dragons. D & D* then found its way on to mainframe computers in the form of Crowther and Woods' original *Adventure,* the forerunner of many adventures on the market today.

When home computers were first released in the late 1970's, early 1980's, it was no great surprise that software houses started to produce adventure games for them. These first adventures were regarded as a revolution in computer games-playing, even though they were quite short in length and simple to complete – and text-only, of course.

They used a very simple verb/noun input such as *Go North* to receive instruction from the player, and as most games at this time were written in Basic and relied heavily on random factors, the result of such an instruction could take a considerable amount of time to be computed and displayed.

The next landmark in computer adventuring was the release of *The Hobbit,* by Melbourne House, based upon Tolkien's novel. *The Hobbit* was a pioneer of graphic adventures: using the computer's built-in graphics facilities to illustrate each location in the adventure. Even though some of the pictures took quite a few minutes to be fully drawn, *The Hobbit* soon became a classic. *Hobbit* bug-collecting, for the game was far from technically perfect, also became a diversionary pastime in its own right.

The success of *The Hobbit* inspired other software houses to incorporate graphics into their own adventure games, but since computer memory at this time was scarce, something drastic needed to be done. Eventually, one software house did discover a way in which they could combine graphics and meaty text descriptions to produce quality adventures – this company was Level 9, which used a technique which compressed the text needed for each description and so took less memory to store, this memory was then used for graphics purposes. The end result has been a series of very good graphically supported text adventures from the company.

There have always been people, though, who prefer text adventures, who continue to be well catered for. Infocom, in particular, produces adventures of unsurpassable quality, which offer sizeable chunks of description, mind-blowing puzzles and a dash of humour for good measure.

Probably the main source of inspiration these days for writing adventure games comes from existing books, films or television programmes. Probably the first in this category was *The Hobbit,* but more recent releases include Frederick Forsyth's *The Fourth Protocol, Lord of the Rings* and the game of the television series of the amazingly popular book *The Secret Diary of Adrian Mole Aged 13¾.* The success of such 'second hand' material may be purely psychological – the phrase 'You've read the book, now see the film!' seems to have been replaced by 'You've read the book, seen the film, now play the game!' Another book which made it successfully onto magnetic tape was *Rebel Planet* – based on one of the popular Fighting Fantasy gamebooks from Ian Livingstone and Steve Jackson.

Fighting Fantasy brings me nicely to my next subject, the recent popularity boom of role-playing games (RPGs). As I said earlier, RPGs first began in the early 1970's with *Dungeons & Dragons,* but today there are literally hundreds of different types. Now it seems that the computer owner wants to play this kind of game. There are a sprinkling of games in this category which serve to temporarily quench this thirst for such things, a few examples are *Swords and Sorcery, Phantasie, Appointment with FEAR* and *Demons of the Deep.*

The obvious question now to follow is, where do we go from here? With the promise (or hope) of more hardware for less money, we can expect to be able to talk to our computer and listen to its reply, or to watch ourselves take part in an adventure which uses a video-disc player. All it takes to give the whole computing scene a good shake-up is one idea . . .

In *Borrowed Time,* from Activision, you're a private eye who has been foolish enough to agree to investigate a local mobster. He responds to this invasion of privacy by attempting to have you shot, kidnapping your ex-wife, and sundry other forms of gentle persuasion

Sole destroying

More on Mirrorsoft's Icon Jon, and a foretaste of some tips to come for Nosferatu by Pirahna – all courtesy of Tony Kendle

Here's a quick poke from regular contributor Chris Eastwood for Commodore owners with a reset switch – to remove the aliens from *Light Force* load the game, reset it and type *Poke 13186,0.* To restart the game type *Sys 2061.* It rather undoes the point of the game I admit, so if anyone can do better (as in extra or infinite lives) I will be pleased to hear from you.

Now we're carrying on from last week with more tips for the Mirrorsoft game *Icon Jon.* We left you having discovered a new room in the game. The next step is to pick up the plastic in the memory bank. Pick up the battery in the hardware store (next to the Rom select room). Now chat to Chip about the Z80, reviewers and Amstrad.

Give the battery to Andy in return for the LED. Get the duster from monitor and rub the plastic. Now chat to Andy about weather, garden and reviewer.

Now give the plastic to Andy in return for the talisman (the cross). Pick up the transistor in the bug's lair. Use the transistor in the amplifier room to enter the dodgy cable. Pick up the letter A in the cable. Take this letter A to the Rom Select Room and select the printer Rom by pressing key four.

Enter the Rom room to get to the new printer. Take the edge connector from the printer and microscope from the paper feeder. Hit the edge connector with the file and it will turn to gold.

Combine the gold and the jam (the logic here is that "bread" and jam go together to make a sandwich). Give this jam butty to Andy in return for the spade.

Take this spade and dig with it in the ZX81 room (under the X). Take the disc that you find and insert it in the Rom select room. Press number 6 to select the disc Rom. Enter the disc Rom. Take the machine code (the weight) that you find there.

Use the machine code in the bric-a-brac shop to enter the mousehole (no I don't understand it either). Take the cheese you find in the mousehole. Wave this cheese in front of the eyes on the tablescape. The mouse will take it from you and exchange it for a pot of glue. Go to the lift control room and take the fish. If you examine them with the microscope you will find out that they are soles (groan!).

Combine the glue with the soles. This will enable you to go through the dodgy cable as your feet are now insulated. Read the sign with the number on it in the next room – the brain room.

Go to the Rom select room for the final time and press button 1 to select the modem. Enter the modem Rom and dial the number given in the brain in the telephone booth. You will now be able to enter the door at the heart of the modem. You are now free!

I have to say that if you are anything like me you will have badly needed those tips – the authors of the game seem to have slightly lost sight of the distinction between logical puzzles that give the player some hope and infuriating random problems that can only be solved by trial and error.

The same apparently can't be said about the new Piranha game *Nosferatu,* programmed by members of Design Design. This game, like Ocean's brilliant *Great Escape* (again by Design Design), has used the 3D filmation type technique to create a believable world where you can go wherever you wish and manipulate most of the objects you find.

Chris Stoneham has kindly provided these tips for the first part of the game. "Not having much time to spend getting too complex games and not being a mega-wizard with the joystick I found *Nosferatu* a brilliant blend of ingredients. The puzzles, whilst not obvious, all have fairly logical solutions and killing the monsters relies on simply having the right objects and doing the right things rather than requiring double jointed keyboard bashing.

"The key to the first level is knowing where to look for objects. Things are hidden around the house in various places – fireplaces, drawers and cupboards usually, although they sometimes lie in full view on top of tables, etc. Certain of the objects, notably the candles (which seem to have no real use), and the deeds to the house (which are vitally important) may be in any one of half a dozen positions every time you play the game".

With that taster, we'll leave you for this week. Next time we'll have more details on getting further with *Nosferatu.*

Charts

Top Twenty

1	(1)	Gauntlet	**US Gold**
2	(3)	Computer Hits Vol 3	**Beau Jolly**
3	(4)	Space Harrier	**Elite**
4	(14)	Footballer of the Year	**Gremlin Graphics**
5	(7)	Konami's Coin-op Hits	**Imagine**
6	(6)	Hit Pack	**Elite**
7	(11)	180	**Mastertronic**
8	(5)	Paperboy	**Elite**
9	(3)	Trivial Pursuit	**Domark**
10	(15)	BMX Simulator	**Code Masters**
11	(9)	Ollie and Lisa	**Firebird**
12	(8)	Five Star Games	**Beau Jolly**
13	(10)	Cobra	**Ocean**
14	(12)	Scooby Doo	**Elite**
15	(19)	Breakthrough	**Data-East/US Gold**
16	(13)	Super Soccer	**Imagine**
17	(18)	Head Coach	**Addictive Games**
18	(16)	The Great Escape	**Ocean**
19	(–)	They Sold a Million (3)	**Hit Squad**
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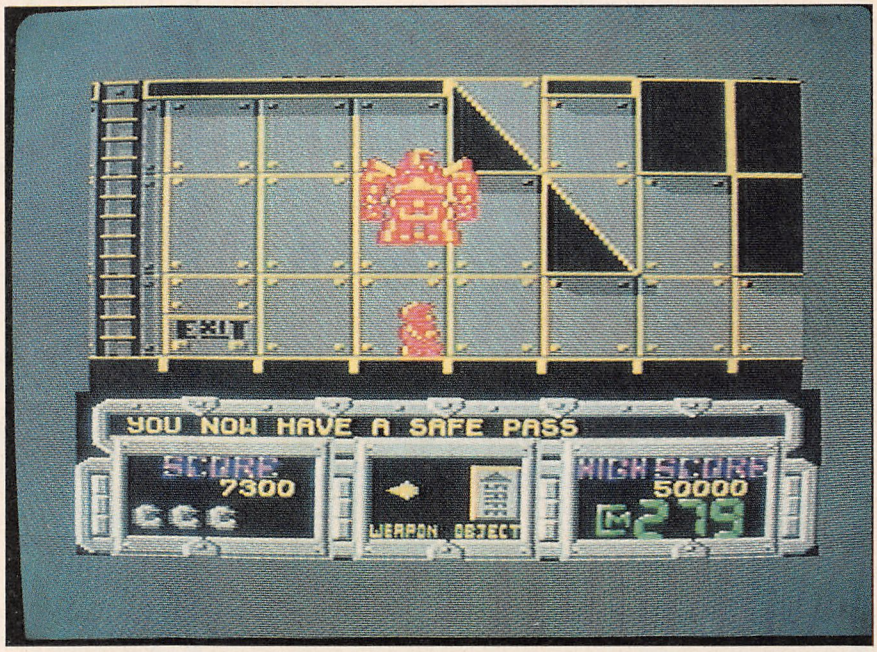


The era of the platforms and ladders game may well be over, but the odd one still crops up from time to time, more often in the budget arena nowadays.

So to get away with that tried and tested formula at full price, any title is going to have to be pretty el neato. Just as well *Future Knight* on the Commodore 64 is.

The quest (as if anyone ever needed an excuse to leap over vats of boiling stuff) is to rescue the proverbial damsel in distress, who has been captured by evil aliens.

You appear inside her spaceship, and must leap/zap your way out to the surface of the planet to ultimately save her from a fate worse than watching a repeat of the Christmas edition of *East-Enders.*

To the game's credit, there is more to it than that – puzzles to solve, objects to collect and use when necessary, certainly enough to allow it the tag of 'arcade adventure'.

What raises *Future Knight* from the crowd, however, is the excellent standard of programming, graphics and sound.

Mr Sheen would be proud of this polish with nice smooth scrolling, well designed backgrounds and sprites, decent effects as you weeble through the adventure. Can you save the lovely Amelia from the clutches of the crazed Spegbott the Terrible?

On this format, recommended, particularly if you want to see how far we've come since *Jet Set Willy.*

Popular Appeal ♦♦♦
John Cook

Program *Future Knight* **Micro** Commodore 64 **Price** £9.95 (tape), £14.95 (disc) **Supplier** Gremlin Graphics, Alpha House, 10 Carver Street, Sheffield S1 4FS.

Devious Xevious

Xevious was the coin-op which brought respectability back to the pure shoot-'em-up. Just when the whole genre appeared played out, the combination of stunning graphics and imaginative gameplay made jaded fingers reach for the fire-button again.

The Amstrad version of the game is very faithful to the original. The left hand side shows your score and remaining lives, while the main part shows the vertically-scrolling landscape from above. Your fighter moves freely over the landscape, zapping enemies and dropping bombs on ground emplacements.

In the original, dropping bombs involved pulling back on the joystick while pressing the fire button, while here the bombs are dropped automatically; this seems to make things rather too easy.

The graphics of the background are as good as anything I've seen on the Amstrad, with nice metallic gun emplacements, mobile tanks, whirling fighters and swarms of bombs. However, if you just keep zapping away it is a breeze, and I managed to complete the first several levels with little difficulty.

A decent conversion, complete with the annoying four-note musical accompaniment, which will certainly disappoint no-one. However, competition from a number of similar games makes *Xevious* fail to stand out as much as it would have six months ago.

Popular Appeal ♦♦♦
Chris Jenkins

Program *Xevious* **Micro** Amstrad CPC **Price** £9.99 (tape), £14.99 (disc), **Supplier** U.S. Gold, Units 2/3, Holford Way, Holford, Birmingham B6 7AX.

A flash in the pan?

Is there no end to the quest for ever more flashy, destructive shoot-'em-ups? Let's hope not. The latest Firebird effort, *Gunstar,* gets ten for polish, five for gameplay and a big fat zero for originality, but at £1.99 who's complaining?

Animation is very smooth, and design of the ships and screen displays top class, but the action is predictable; zap the swirling enemy fighters, destroy the mothership, shoot the robot, de dum de dum de dum.

Overall *Gunstar* comes out as an average arcade game with more trimmings than usual, but you'll have your £1.99's worth out of it.

Popular Appeal ♦♦♦
Chris Jenkins

Program *Gunstar* **Micro** Spectrum 48K **Price** £1.99 **Supplier** Firebird, 64–76 New Oxford Street, London WC1A 1PS.

You're in the army now

Strategic Simulations Inc (SSI) is one of the best known combat simulation software producers, and has made something of a speciality of modern (1940–90) warfare.

Battalion Commander is one of these and is now out in this country courtesy of US Gold. The game is based at battalion level, allowing you to command one or two battalions of US, Soviet or Chinese troops against another of the same on a variety of maps.

Micros seem to be well-suited for simulations on this tactical level, as it's possible to control larger forces than you could on a table top but to retain a certain amount of control over events at tactical level.

Battalion Commander's command structure is particularly valuable here. As you are running a battalion the system allows you to give general commands to the four companies and the odd ancillary unit within the battalion. You can assume direct command of individual companies down to platoon level, but it seemed to work quite well confined to the highest command level, and this structure means you can simply issue general commands to four groups of unit rather than having to instruct dozens of units individually.

You can play three sorts of games: defence, evenly matched or attack, with the opposing forces being balanced accordingly. All of them start with your forces (titchy little tank, truck and infantry graphics) on the map, and with the enemy forces appearing as you get into the game.

The game proceeds in real time, which means that the battle will continue whether you issue orders or not, and you therefore need to be able to react quickly to on-screen messages. Typically this means laying down smoke and calling in artillery strikes when the other side makes its move.

Could do better, but then again so could everybody else – a fine wargame.

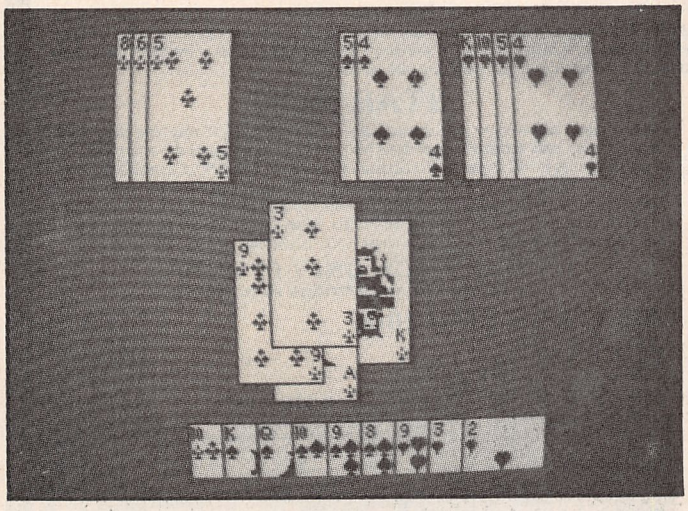
Popular Appeal ♦♦♦♦

John Lettice

Program *Battalion Commander* **Micro** Commodore 64 **Price** £9.99 (tape), £14.99 (disc) **Supplier** US Gold, Units 2/3, Holford Way, Holford, Birmingham B6 7AX.

Bridging the gap

Quality Bridge simulations are now beginning to appear after years in the doldrums, and this, an English version of a French title, definitely should be filed under Quality. The usual format applies; the computer plays the other three hands for you in bidding and play and keeps score.



Available for Amstrad and MSX now and Commodore shortly, *Bridge* assumes the player knows the game, and doesn't need any basic Bridge tuition. It is therefore not as suitable for beginners as, say, *Colossus Bridge.* However, it plays one of the strongest games I have seen on a computer Bridge simulation.

Unusually for games of this genre, it uses a graphical screen representation with pictures of the cards rather than listing 2H, 3C, etc, and you select your cards by moving the cursor over them. Bidding is also done by selecting options with the cursor.

There are a wealth of conventions available, which, and this is one of the product's strong points, can be toggled on and off at will. This is excellent, because it means you are not forced to adopt any bidding conventions you are not familiar with.

Criticisms centre mainly round the lack of screen information. When playing out the contract, it will not remind you what the contract is, or which side is declaring. You can switch to the 'cheat' screen for this information, but this will also show you the full holding of each player's cards (which is why it's called a cheat screen).

That's only a minor niggle. Generally, Infogrames' *Bridge* is an excellent program.

Popular Appeal ♦♦♦♦

Christina Erskine

Program *Bridge* **Micros** Amstrad CPCs, Commodore 64/128, MSX I and II **Price** £12.95 (tape), £15.95 (disc) **Supplier** Infogrames, Mitre House, Enfield, Middx.

Ice hockey in outer space?

Reminiscent of Firebird's *Thrust* in the way it uses minimal graphics to create a very playable game, Mastertronic's *Hyperbowl* should be good for many hours of entertainment.

A one- or two-player game set in a future where even ice-hockey has gone high-tech, *Hyperbowl* is very straightforward; score more goals than your opponent in a five-minute game to move on to the next round.

Your weapon is a high-speed skimmer equipped with inertial drive and cannon. This enables you to move your ship around using either keyboard or joystick, stop dead once you find the puck, then ram or blast it towards your opponent's goal.

The goal consists of a long line – one point for a hit – and a small cross – two points. Since the puck has its own inertia, it requires a good deal of skill to manoeuvre it in the required direction, especially when your opponent has other ideas.

If you lose track of what's happening, a scanner on the right hand side of the screen shows you the relative position of the two ships, the ball, and the elastic sides of the gamefield.

The graphics are simply line images, similar to those in *Thrust* or the original *Asteroids* game, but the action is so fast and furious that this hardly matters.

There are ten types of ship to choose from, each with different movement characteristics, and three levels of play.

Excellent fun, a bargain at the price, Commodore version to come.

Popular Appeal ♦♦♦♦

Chris Jenkins

Program *Hyperbowl* **Micro** Spectrum 48K **Price** £1.99 **Supplier** Mastertronic, 8–10 Paul Street, London EC2A 4HJ.

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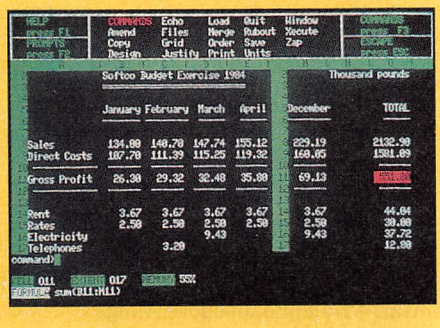

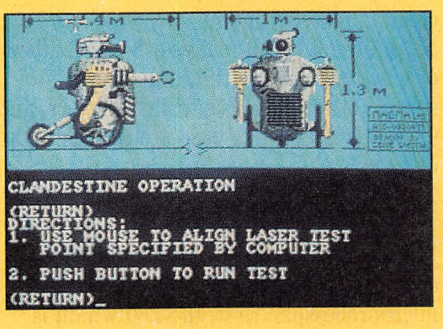

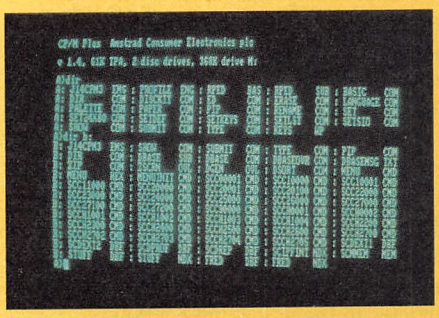

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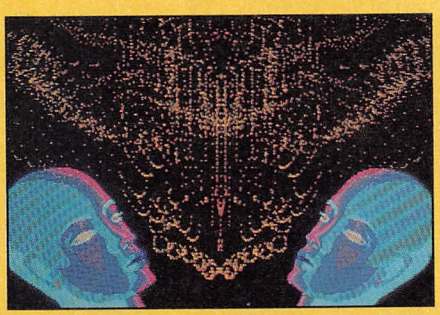
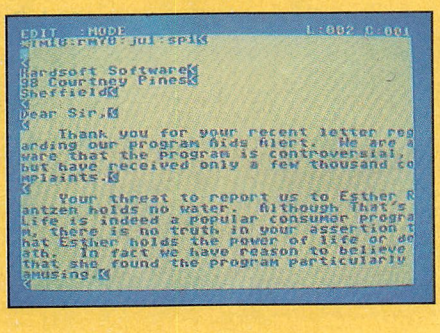
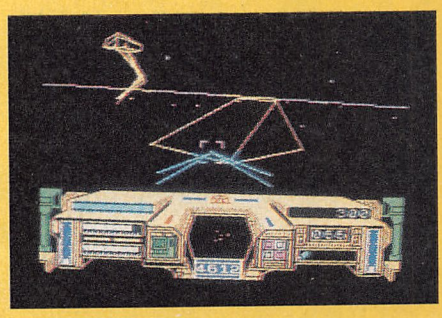






Four-part introduction to computing

Computer anatomy

If you own a computer – even if it's a very recent acquisition – the chances are you know something about the hardware.

You probably also know some of the jargon associated with computers. But how much? How about the differences between parallel and serial interfaces? Or the different kinds of video output?

One of the problems facing the computing novice is understanding much of what the magazines are talking about. Because most of our readers have considerable experience with their machines, we have to address most of our articles to them, leaving beginners floundering to understand what we're talking about. If that sounds like you, read on, and hopefully all will become clear.

Despite all of the differences between the various models, all computers are essentially the same: a microprocessor handles information, memory chips store raw data and the processed results, a keyboard allows you to communicate with the machine, and some kind of visual display allows the computer to communicate with you.

Additionally, all makes offer a number of ways of allowing the computer to control other devices such as printers, and storage systems like cassette recorders or disc drives.

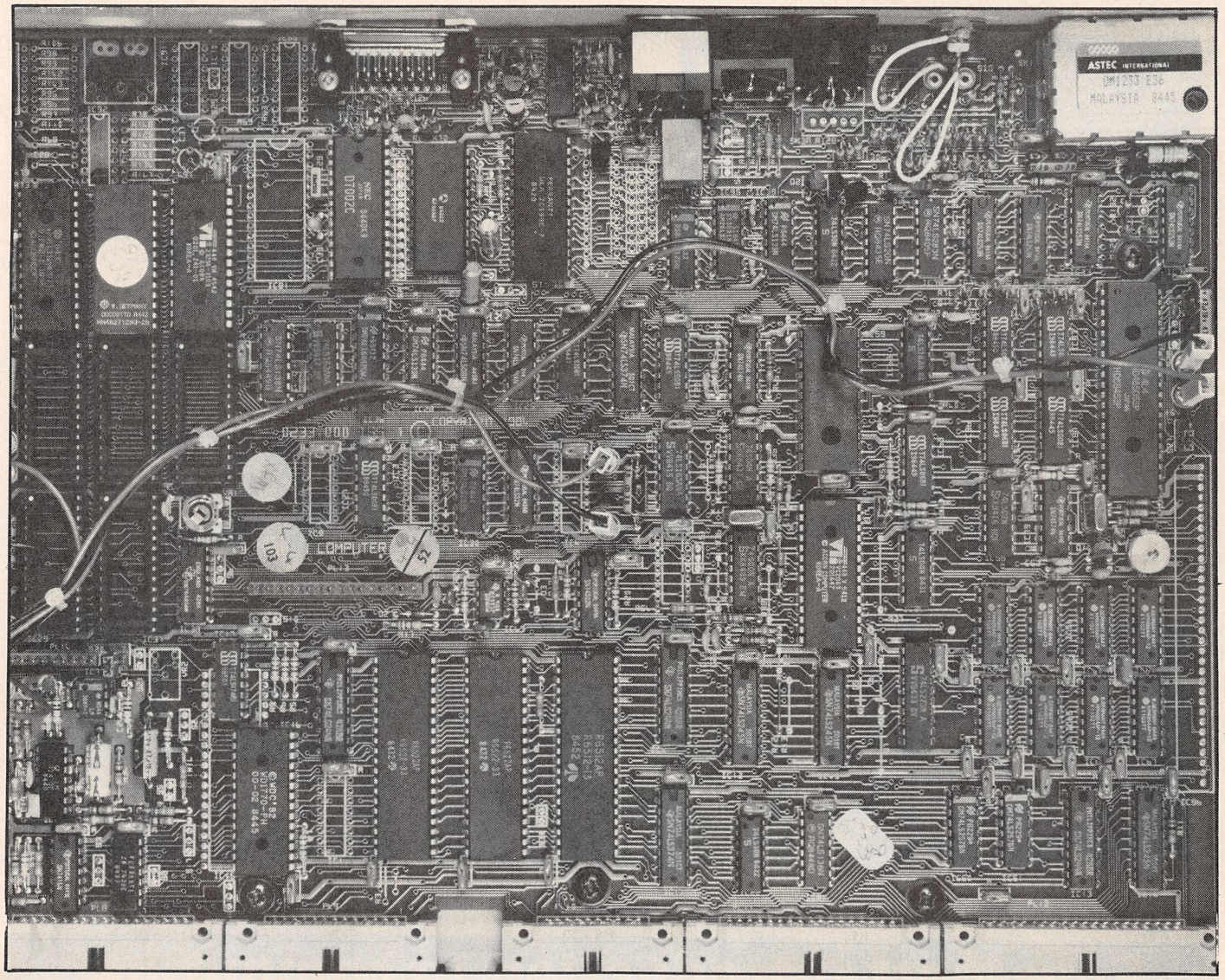
Microprocessors

Not long ago, virtually all personal computers used one of two microprocessors: first, the Z80 which is the brains of the Sinclair ZX81 and Spectrum, the Amstrad CPCs and all CP/M business systems including the Amstrad PCWs. Second, the 6502, which was used in all of Commodore's early machines, from the Pet, through the Vic 20, to the C64, as well as in the Atari 400/800/130, Apple II and BBC Micros.

The only serious pretender was the 6809 used in the Dragon and Tandy Colour Computers.

The Z80 and 6502 are 8-bit processors (see the panel for a full explanation of bits, bytes and related matters). More recent machines employ more powerful processors – either 16-bit or in some cases 32-bit chips. Once again there are two schools: the 80xx series used in the IBM PC, Amstrad PC1512 and other IBM-compatible business systems; and the 68000 family used in the Apple Macintosh, Atari ST and Commodore Amiga.

The most important point about different processors is that software written for one type of processor will not work with another. Lesser factors include how much memory each processor can address, and their relative strengths at



The circuit board of the BBC Model B: the three large chips at the foot of the picture are the 6502 microprocessor (right) and two input/output chips. The memory block is on the right, with interfaces arrayed along the front and back.

different tasks (the 68000, for example, is very powerful in graphics handling).

At this point a word about dedicated processors is also in order. In the earliest computers, the main processor did everything. Now, its workload has been greatly reduced by the design of dedicated chips to handle things like graphics, sound, input/output and so on.

The use of these chips has produced an overall increase in the speed of computers.

Memory

The only thing to know about memory is that the more of it you have, the better. Large memories mean that your computer can hold larger programs and, broadly speaking, large programs are more powerful and easier to use.

The cost of memory chips has fallen dramatically in the 1980s, and is largely responsible for the low cost of today's computers.

For example, the Vic 20 of 1981 cost £300 and came with 3·5K of memory. In 1983 your £300 bought you 64K in the form of the Commodore 64. In 1986, 520K of memory was yours for £300 in the Atari ST.

The other change in memory chips has been the capacity of the chips themselves. Memory chips come in larger or smaller configurations of bits. A few years ago, the standard chip size was an 8K chip - 8K × 1 bits, so you needed eight chips to get 8Kbytes of memory.

Now, 64K chips are standard, so you need only eight chips to get 64Kbytes. And 256K and 512K chips are becoming increasingly common.

This has meant that the number of components in your computer has come down, simplifying designs, and generally reducing costs.

Input devices

The most common input device is, and will remain for some time, the keyboard. It is the most flexible method of communicating with the machine, research efforts into voice recognition notwithstanding. (Most of the impetus for voice recognition comes from the high-flying executives responsiblefor running the world's major corporations. It seems they find it impossible to learn what humble secretaries, alcohol-befuddled journalists, and teenage computer enthusiasts master with ease - typing.)

However, a development of recent years has been the increasing use of dedicated input devices for specific tasks. Games players now use joysticks as standard, tracker balls have their devotees, and mice are proliferating.

The application with the greatest need for specific input devices is graphics. The original favourite here was the light pen, but this has since been supplanted by the graphics tablet which allows the user to draw with a stylus on a pressure-sensitive pad.

Output

One of the interesting aspects of computer jargon is how much it actually conceals. The most common output device is a visual display unit. End of story? Not quite.

Your vdu might be your TV set - provided your computer can output the correct signal. Most can . . . the Atari ST can't (but the STM can). The problem with TVs is that a) the picture quality isn't great, and b) there may be other claimants for the TV.

That's why many computer users opt for a dedicated monitor. And this is where it gets complicated. There are two totally different kinds of monitor output - RGB and composite.

RGB creates the colour image by sending separate signals for red, green and blue (hence the name). It may also

Bits of binary

Since we humans begin learning decimal numbering from our earliest years, it isn't surprising that first-time computer users struggle with the binary numbering used by computers.

At its most fundamental level, the computer is a binary system. Its basic unit of thought is on/off, yes/no, 1/0, high voltage/low voltage - however you care to think of it. This is encapsulated in the term bit, a contraction of binary digit.

The next unit of computer numeracy is the byte. Originally a byte meant whatever chunk of information a microprocessor could handle, so that a four-bit processor had a four-bit byte, and so on. However, since the majority of microcomputers were (and still are) based on eight-bit microprocessors, byte has been standardised as a single piece of data eight bits long.

Going further up the scale, the standard grouping of bytes is a kilobyte (normally abbreviated as K, hence 64K). Now everybody knows that kilo means "thousand" . . . everyone except computer users. The trouble is that 1,000 is not a meaningful number in binary, so early users latched on to 1,024 - the nearest number to 1,000 which is also a power of 2 (2 to the power of 10, to be precise).

From this you might assume that the next unit up, a megabyte, is 1,024 kilobytes, and you'd be right. Incidentally, this is why the Atari STs have such apparently odd designations - the 1040 ST has one megabyte of memory, which is actually 1,048,576 bytes (you're right . . . it doesn't make much sense).

Backtracking a little, the powers of two syndrome also shows in the regularity with which certain numbers crop up - usually in multiples of eight, 16, 32, 64, 128, 256 and 512.

Other aspects of your computer arise from the same principles. For example, if you've dabbled in Basic programming, you might have encountered the fact that you can only store a number of 255 or less in a memory location. This is simply because your memory locations are eight bits long, and 2 to the power of 8 is 256, giving numbers between 0 and 255.

The recent switch from 8-bit processors to 16- and 32-bit systems hasn't changed things very much. Because the byte has been standardised, new expressions were needed to designate the bigger chunks of data. So a 16-bit chunk is now termed a word, and a 32-bit chunk is a longword.

One difference the move to bigger processors has made is the ability of computers to address larger amounts of memory. The power of microprocessors is generally measured by the size of the data register (that is, the part of the processor that holds information that is being manipulated). But two other factors apply: the size of the address bus and the size of the data bus.

A microprocessor might have an 8-bit data register, an 8-bit data bus, and a 16-bit address bus. This means that it can manipulate data one byte at a time, it can fetch and store data one byte at a time, and it can address 2 to the power of 16 memory locations - 65,536 or 64K.

Eight-bit processors like the 6502 and Z80 have 16-bit address busses which is why 64K was, for a long time, the upper memory limit for these machines. This limitation has been circumvented by adding extra blocks of 64K and allowing the processor to choose which block it looks at, but it is still impossible for an 8-bit processor to make full use of more than 64K of memory (which is why the Amstrad PCW256 uses the extra memory as a RAM disc).

Processors like the Motorola 68000 have a bigger address bus, which allows machines like the ST to address one megabyte and more of memory. 32-bit data registers and 16- and 32-bit data busses also mean that these processors are very much faster.

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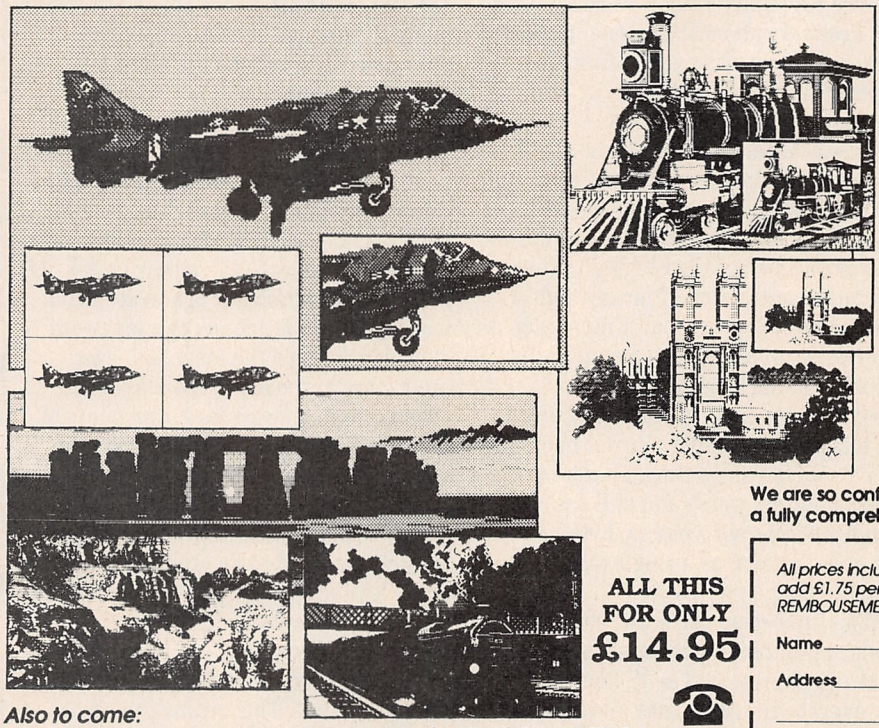

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send any or all of the following: luminance (brightness), horizontal and vertical synchronisation signals, and audio, among others.

The catch is that not all interfaces send the same signals, and not all monitors can accept them. This means you can't just walk into your friendly local dealer, slap down your hard-earned, and walk out with the cheapest model. You have to make sure that the monitor you want will work with your computer.

Composite video is simpler, but produces a picture of lower quality. Its name derives from the fact that all of the various signals are lumped together - hence, simpler but not quite so effective.

In the bad old days only the most expensive computers had vdus. Others had only printers (imagine an arcade game played under those conditions).

Now printers are common place and usually figure high on every computer owner's shopping list. We'll be looking at printers in depth in a later article. For the moment we're concerned with generalities.

The reason a printer is so desirable is that it greatly extends the usefulness of your machine. Obviously, applications like word processing are rather pointless unless there's some way of producing a copy of your work, but it goes further than this.

If you're a programmer, you'll find life a lot easier if you can examine a full listing of your program on paper, rather than flipping backwards and forwards through the program on screen. A printer allows you to create pictures and diagrams, lists and catalogues, letters and listings. In short, the printer turns your computer into a useful tool.

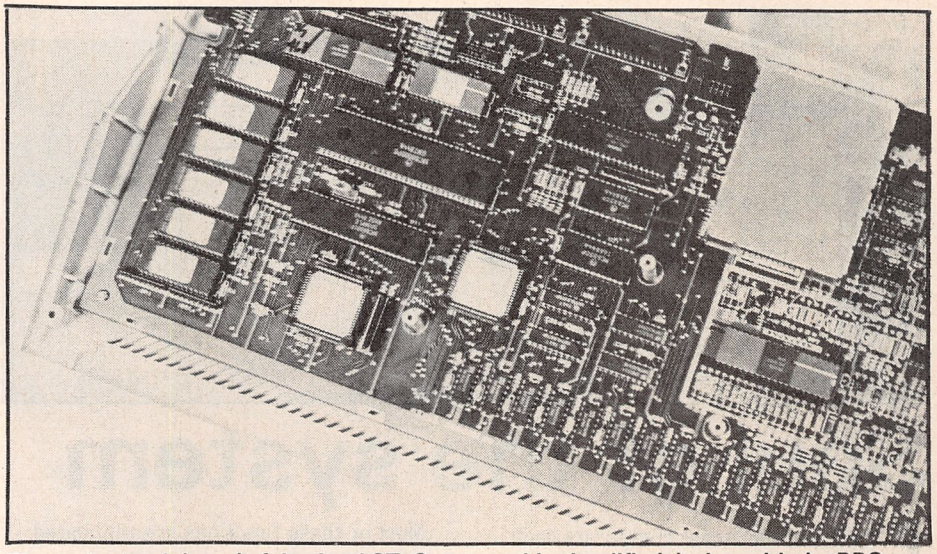
As with displays, the problems with printers generally arise from trying to attach one to your computer. And again, there are two possibilities.

The first, and less common, is called serial interfacing, also dubbed RS-232, RS-423 or similar. It is called serial because the data is sent one bit at a time, one bit after the other.

This is its obvious drawback - lack of speed. Less obvious problems arise from the fact that the RS standard was not designed for printers. It's a catch-all standard for data communication between any two devices. To allow the standard to be as flexible as possible, a great deal of setting up is required - the computer and the printer must operate on the same assumptions (called protocols) about what form the data will take.

Protocols include information about how fast the data will be sent, how many bits of a byte will be data, and which bits will have other functions.

The second standard in printer interfacing is called parallel, or Centronics. As you might guess, it's called parallel because all eight bits are sent at the same time which obviously gives it a speed advantage over serial.



The main circuit board of the Atari ST. Compare this simplified design with the BBC board on p22, despite the fact that the ST is by far the more powerful machine. The large chip (centre, left) is the 68000 processor. The row of chips along the bottom is the 520K of RAM memory.

More importantly, parallel is a dedicated printer interface which means the problems in connecting a printer to your computer are greatly reduced. Generally, you can simply plug in and go.

Emphasis on the word "generally". One snag is that parallel and Centronics are not synonymous, although most people talk as if they are.

The Centronics label comes from the company that once was the leading manufacturer of printers. Centronics printers used a proprietary form of parallel interface which was almost, but not quite, precisely copied by rival firms, notably Epson.

This means that there may be a slight doubt about compatibility if your computer interface says parallel and the printer interface says Centronics.

Commodore owners have a special problem in that computers like the Vic 20, C64 and C128 use an interface unique to Commodore. The idea is that you have to buy Commodore printers.

However, you can readily buy bits of gadgetry that sit between the computer and the printer which will allow you to buy the printer of your choice. This is recommended since it means if you sell your Commodore computer and buy a rival make you don't have to buy a new printer as well.

Storage

Today disc drives are common, rapidly supplanting cassette-based systems. But before magnetic tape there was . . . paper.

Hard to credit, but it isn't long since all computer software came on punched paper tape. However, the obvious drawbacks quickly forced a new approach and the common cassette recorder was pressed into service.

Tape had a number of advantages which still hold true day. Tape recorder/players were and are commonplace and relatively cheap. And the tapes themselves are also cheap and readily available.

The big snag with tape is speed. Ordinary tape players are slow, and - worse - they're sequential. If the program or data you want is at the end of the tape, you have to bypass all of the irrelevant stuff that comes before.

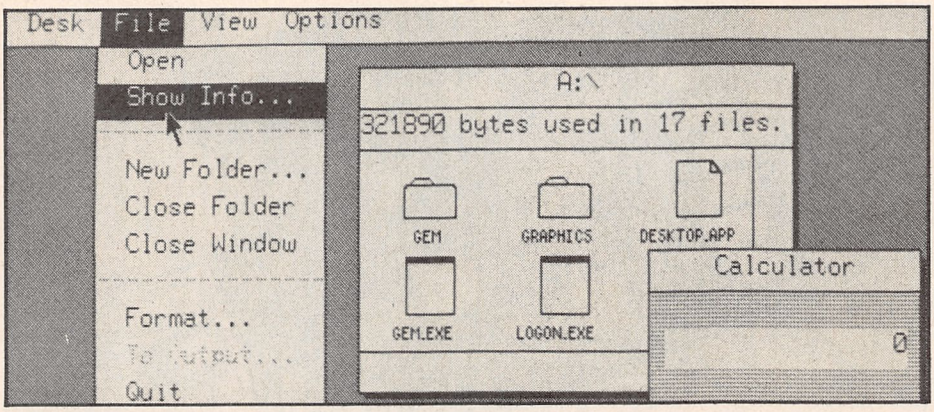
Disc drives overcome both problems. The read/write head, like the needle on a record player, can be lifted and positioned anywhere on the disc. This means they are not only faster, but can use techniques like random filing where the head can jump backwards and forwards, picking up information as needed.

However, disc drives are still relatively expensive - especially for cheaper home computers where the drive can rival the cost of the computer itself.

But prices are being forced down and already looming on the horizon is the prospect of cheap hard disc storage.

The standard type of disc drive uses a flexible disc called a floppy (do not test this by bending your discs). Hard discs are rigid, and completely enclosed within the drive itself. This allows them to spin hundreds of times faster than floppy discs, and because the disc itself spins faster, much more information can be written to the disc.

A program which might take a couple of minutes to load from a floppy will load in seconds from a hard disc. And while a floppy can store between 100K and 400K of data, a hard disc typically handles between 5 and 20 megabytes.



Soul of the system

In traditional business computers such as the IBM PC and the earlier CP/M micros, there is a distinct dividing line between an operating system and a programming language. This distinction was blurred in home computers like the Spectrum and Commodores where the operating system may have been a part of the built-in Basic language.

Operating systems are built-in programs that allow the computer to perform a number of fundamental jobs – loading and running other programs, reading the keyboard, displaying information on a screen, and so on. Because most of these functions are related to handling disc storage, most business operating systems are known as disc operating systems, or DOS for short.

The first operating system to receive widespread acceptance was Digital Research's Control Program for Microcomputers, or CP/M. (One of the many in-jokes in the film *Tron* was naming the evil computer mastermind MCP.)

CP/M was originally written for computers using the 8080 microprocessor and when this was replaced by the Z80, CP/M was upgraded and quickly became the standard operating system for Z80-based machines.

When IBM launched its PC, it needed a 16-bit operating system. By this time, DR had a suitable product in CP/M-86 but IBM instead opted for Microsoft's MS-DOS and, given the runaway success of the IBM PC and its compatibles, MS-DOS quickly supplanted CP/M as the industry standard operating system.

However, CP/M has undergone something of a resurgence in the past 18 months through the efforts of several home computer manufacturers – most notably Amstrad and Tatung.

The basic functions of CP/M are disc-based covering disc directories, copying, re-naming and erasing files, but you can also set up the operating system for things like screen displays and printer control.

Most of these functions are replicated by MS-DOS, although with additional commands and functions to accommodate the extra power and memory of 16-bit computers.

With a computer running CP/M or MS-DOS – such as Amstrad's PCW8256 or PC1512 – programming languages are applications, which means they have to be loaded separately from disc in the same way as word processors or databases or any other software package.

With home computers such as the Amstrad CPC range, or the Sinclair and Commodore micros, a programming language is built-in and the language itself replicates most of the functions of an operating system. In almost every case that built-in language is Basic, and Basic provides commands for handling disc and tape storage, driving a printer, and so on.

Even when software is not written in Basic – machine-code programs, for instance – it will be loaded and run using Basic.

Friendly computers

The most important result of this difference between micros that have traditionally been thought of as home computers and those designed for business use is that the home computers have always been friendlier and easier to use.

For example, most home computers provide a screen editor which allows you to type commands, erase and edit them, and move the cursor around the screen with great ease. Also, if you attempt to load a program from disc and encounter a problem, generally the home computer will give you a fair indication of what the problem is (eg, drive not responding, file not present, wrong command).

In contrast, most CP/M editors are exceedingly primitive, and disc problems generally provoke the mystical response "BDOS ERROR ON A". You're on your own when it comes to finding out what the problem is.

So if the "non-operating systems" provided on cheap home computers are generally better, why don't all computers employ them?

The answer is due to a number of factors. First, CP/M predated the home computer boom by several years, at a time before user-friendliness became one of the industry's buzzwords. If the computer worked at all, it was good enough. The fact that MS-DOS, a much more recent product, provided little advance was due to the fact that it was as near a copy of CP/M as was deemed desirable.

The prevailing attitude, that using computers was meant to be one of the arcane arts, didn't help. Whereas home computers were designed to have as wide an appeal as possible.

The current "last word" in user-friendliness appeared in the last two years with the introduction of Apple's Macintosh wh ere the operating system (unique to Apple) relies on visual devices to guide the owner through its use. Discs are represented by small pictures of discs, documents by pictures of pieces of paper. Copying a file from one disc to another simply involves dragging the picture representing that file from one disc image to another (compared to CP/Ms cumbersome and unintelligible PIP B: = A: Filename).

Although the Macintosh itself has not sold in vast numbers, other manufacturers quickly recognised the value of this way of working. Leading the field among the emulators are the two traditional exponents of the operating system art. Digital Research has gained the early lead with Gem (Graphics Environment Manager) while Microsoft has floundered somewhat with its own offering, Windows.

These products are not true operating systems, however. They are more of a "friendly face" bolted on to existing DOS products. In the case of Windows, the operating system is MS-DOS, while Gem works with both MS-DOS and DR's own Concurrent DOS, as well as the hybrid CP/M 68K version produced for Atari.

Although attempts have been made to marry products like these with existing home micros (AMX on the BBC and Amstrad CPCs, GEOS on the Commodore 64), such attempts have generally been unsuccessful for the simple reason that because these graphic environments are not part and parcel of the machine, there's little incentive for anyone to produce software that will run with them.

Gem is a different story, since DR is actively recruiting software producers to support the Gem standard. However, to get your hands on Gem you'll have to invest in one of the new generation of low-cost personal computers – the Amstrad PC1512 or the Atari ST.

Next week: a closer look at CP/M.

Popular Index 1986

Find all those features you wanted to look at again with this four-page, complete guide to everything fit to print in 1986. The entries are listed by the issue number, followed by the page number. For example, the review listed as Academy; 45,16 indicates that the review can be found on page 16 of issue number 45 (all Volume 5).

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Begin Basic

Virtually every home computer on the market is equipped with Basic as its built-in programming language. Even those without a built-in language – such as the Atari ST – have Basic available, so the chances are that the most common of all computer languages is at your fingertips.

The first question most computer owners ask is: why program at all? For the complete novice the task appears daunting and best suited to mathematically-minded whizz-kids. In fact, you need not be good at maths. All you need is patience and imagination.

Programming the computer – thinking up the idea, entering the instructions, eliminating faults, and seeing the finished program work – can be immensely satisfying in itself. It gives you real power over the computer, and it gives you more insight into the way the machine works, allowing you to use it to its full potential.

There is also the possibility of earning some money. Although creating a commercial program is certainly possible, you don't have to write a best-seller to make money. Many magazines, including *Popular,* pay for program listings they publish – enough to make programming worthwhile.

The second question, then, is: why program in Basic?

As we've already noted, Basic is the most common programming language which means that there's a great deal of help available while you're learning to program – from magazines, books and other users. Basic is the most common language because it's the easiest language to learn.

Of course, there are things which Basic cannot do. For instance, it isn't a fast language so you can't write very fast arcade games. But there is a whole range of possibilities – simple word processors, databases, educational programs, small utility programs that help you to write other programs, adventure and strategy games can all be written in Basic.

A minor snag is that all computers use slightly different dialects of the language, but there are a great many books (including the manual that came with your machine) to help you learn. The purpose of this series of articles is to introduce some of the wider aspects of Basic.

To this end, we will consider three different aspects of Basic programming: handling data, program control, and colour and graphics.

Handling data

Data means information – any information, whether numbers or letters. The computer stores this data in the form of variables, and variables come in two kinds.

The first is a numeric variable which contains numbers only; the second is called a string variable and can contain numbers or letters or both. String variables are denoted by the $ symbol.

Consider these examples:

```
YEAR = 365 (numeric)
YEAR$ = "365 days" (string)
```

Most computers allow you to have variable names of varying lengths but often only the first two letters of the name are significant in which case the computer would consider the variables, *Start, Stop, Stan* to be identical. This is why you will see mainly one or two-letter variable names in most published programs.

Variables are given, or assigned, a value by the *Let* statement, but this is often optional and can be dropped so the following two statements accomplish the same thing:

```
LET A = 100
A = 100
```

Once a variable has been given a value, the computer will remember that value until it is changed, or the computer is switched off. So you can add numeric variables, or perform other mathematical operations:

```
10 A = 5: B = 10
20 C = A + B
30 D = A * B
40 PRINT A, B, C, D
```

You cannot add string variables because you can't add words and letters. What you can do is join strings together, or slice them up. (Joining strings looks like addition but isn't). For example:

```
10 A$ = "One"
20 B$ = "Two"
30 C$ = A$ + B$
40 PRINT C$
```

This will print "OneTwo" on the screen.

The commands for slicing strings are *Left$, Mid$* and *Right$* which take bits from the left, middle and right of another string. Precisely how these commands work will depend on the dialect of Basic your computer uses.

Basic also provides two commands for changing one sort of data to another: *Val* and *Str$*. If numeric variable *X* contains the number 1000, then *Str$(X)* creates a string "1000" which can be manipulated by *Left$, Mid$* and *Right$*. Conversely, *Val("1000")* creates a variable with 1,000 as its value.

Passing data to your programs can be done in several ways. Obviously, you can type in all of the variable assignments when writing the program, but this is a tiresome way of doing things.

Second, you can type in the variable assignments when the program is run by having program lines which ask for the data. Two commands let you do this: *Input* and *Input$* (or similar). These work with numeric and string variables respectively.

Third, you can use the *Data* statement. This allows you to set up a list of data in your program, and your program can access this using the *Read* command, like this:

```
10 DATA Red, Orange, Yellow
20 DATA Green, Blue, Indigo, Violet
30 PRINT "The colours of the rainbow"
40 PRINT "are as follows"
50 READ CO$: PRINT CO$
60 GOTO 50
```

The computer knows where it's got to in the list by means of a data pointer. You can reset the data pointer to the beginning with the *Restore* statement. Some Basics allow you to specify a line number, so *Restore 20* in the above program would set the data pointer to Green.

Most programs use a mixture of these methods, using *Read* and *Data* statements for related lists of information, assigning

individual variables in the program, and letting the user assign variables using *Input* and *Inputs$* where necessary.

One drawback of all these methods is that they require your program to keep track of every individual piece of data, whereas you'll often want certain data to be grouped together.

The answer to this is to use data arrays. Arrays can be either numeric or string, and can have one or more dimensions.

You can think of arrays as tables; for example, a football league table could be held as a two-dimensional array:

Team	Pld	W	D	L	Pts
Team 1	x	x	x	x	x
Team 2	x	x	x	x	x
Team 3	x	x	x	x	x
Team 4	x	x	x	x	x

This is how such an array works: first, dimension the array using the *Dim* statement. In this case we want six items of information for four teams, so *Dim League$(5,3).* Note that the array sizes are one less than needed because the arrays start at zero.

Team names will be held in *League$(0,n);* the number of games won in *League$(5,n),* and so on.

So, the number of lost games for team 3 would be found in *League$(4,2).* Remember that we're using a string array here because we're mixing numbers and letters.

The numeric information is stored as string data and must be converted using the *Val* function before it can be treated as numbers.

Many Basics allow you to use arrays of more than two dimensions. For example, to store the above information for ten seasons, you might use a three-dimensional array *League$(5,3,9)* with the third dimension holding ten sets of two-dimensional arrays.

This looks confusing but becomes clearer if you think about what the array elements represent. Think of the latter array as *League$(data, team, season)* so the information for team 2, season 3, will be found in *League$(n,1,2).*

File handling

There are many commands for reading and writing data to and from tape or disc, and when you consider that those commands are mainly different on each machine, a review of all of them would be very long-winded indeed.

There are four commands which are very similar on all machines, these being Openin (Open on the C64), Openout, Input# and Print#. In order to save data to tape you must first open a file to which that data will be assigned. Openin and Openout, or just Open on the C64 (the Spectrum doesn't use any of these, incidentally), are the commands used to define the file.

The syntax of the command on each machine is slightly different, as can be seen from the example program. Once a file has been opened data can either be saved to it (written), or loaded from it (read). As stated, there are many options with regard to how data is written to the file; one item, blocks of data or entire arrays.

An example would be Print#1,"dog" (C64 and ST version) which sends the string "dog" down channel 1 (that's the #1) to a previously opened file.

Input# is, of course, the opposite of Print# and is used to read data from tape or disc.

If you have a look at Listing 1 most of the concepts discussed so far are put into practice.

As you type it in there is one point to note: many lines have Rem statements on the end. Rem stands for remark and anything following it is ignored by the computer. Okay, the point is if your computer is NOT the one mentioned after the Rem don't type that line in.

Going through it, line 20 defines an array A$ as having fourteen elements, line 30 clears the screen. Lines 50 and 80 provide a loop so that more than one item of data, in lines 130 to 160, may be read into each element of the array. Loops and control structures will be dealt with much more fully next week. Line 70 contains Chr$(X) which turns the numbers in the data statements into their equivalent letters.

Lines 90 to 120 are used to simply print out each element of the array which now contain letters.

The rest of the program demonstrates opening a file, called 'Sample', and saving the data in the array, one element at a time.

Listing 1

```
>
    10 REM Listing 1
    20 DIM A$(14)
    30 CLS:REM Atari ST Amstrad BBC Spect
rum
    40 RESTORE 130
    50 FOR F=1 TO 14
    60 READ X
    70 LET A$(F)=CHR$(X)
    80 NEXT F
    90 FOR F=1 TO 14
   100 PRINT A$(F);
   110 NEXT F
   120 PRINT:PRINT "***************":PRIN
T
   130 DATA 72,97,112,112
   140 DATA 121,32,78,101
   150 DATA 119,32,89,101
   160 DATA 97,114
   170 PRINT"Prepare tape for saving data
"
   180 X=OPENOUT("Sample"):REM BBC
   190 OPENOUT "Sample":REM Amstrad
   200 OPEN 1,1,1,"Sample":REM C64
   210 OPEN "O",#1,"Sample",14:REM Atari
ST
   220 FOR F=1 TO 14
   230 PRINT# X,A$(F):REM BBC
   240 PRINT#9,A$(F):REM Amstrad
   250 PRINT#1,A$(F):REM C64 Atari ST
   260 NEXT F
   270 CLOSE #X:REM BBC
   280 CLOSEOUT:REM Amstrad
   290 CLOSE 1:REM C64 Atari ST
   300 SAVE "Sample" DATA A$():REM Spectr
um
   310 PRINT "All saved"
```

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However, it doesn't seem entirely plausible when you're faced with the keyboard, and a TV screen enigmatically saying "Ready – flash – flash" at you. So, apart from a spot of Basic programming and playing games, what can you actually do with it?

The computer, no matter which brand you have, can actually help with a number of applications – applications being a wide ranging term meaning any activity other than programming and games.

Word processing

This is the main application that most home computer owners will want to get into. Word processing is simply a more sophisticated form of typing documents, where you can revise your work, correct spelling, and specify the way the documents should look on the page before printing it out. The results will therefore be much more professional looking than anything typed and covered with Tippex.

Obvious uses for word processors include school and college essays, club newsletters, office work done at home, curriculum vitae for job applications, and official letters.

There are word processing software packages available for all the home computers currently available, although obviously some computers are better suited to it than others.

You will need a printer, of course, or access to one to print out your documents, and a form of fast storage, such as a disc drive, is desirable, but not essential.

Most word processors will operate in two modes, a 'write' mode where you simply bash away at the keyboard to produce your newsletter, or whatever, and an 'edit' mode, which allows you to go through the text, deleting mistakes, adding extra letters, words or paragraphs, specifying the paragraph breaks, setting out a layout (how wide the columns should be, how much space between lines, etc), whether you would like the document justified – that each line is identical in length, selecting words to print in bold type, or italic type, or underlined.

The major drawback to word processing on a home micro is that most of the less expensive models are geared to a 40-column display (ie, when typing, only 40 characters per line of text will appear on the TV screen). This would look rather silly when printed out, since A4 paper (a standard size – each of *Popular's* page is A4 sized) takes 80 columns comfortably. Nearly every home word processor package takes this problem into account, and while 40 characters per line appears on screen, 80 characters per line are printed out.

To tell you on screen where the line breaks will occur when printed, various devices are used – a special symbol occurring at the end of each 80 characters, for instance. Most packages will also include 'word wrap', that is, if your 80th character appears in the middle of a word, it won't split the word across two lines.

There are also a number of types of product designed to help you word process, of which the most well-known is probably a spell checker. This is basically a computer dictionary which, when loaded up with your document, will highlight words it does not recognise, so that you can check the spelling.

Databases

After word processing, probably the most widely-mentioned application for home computers.

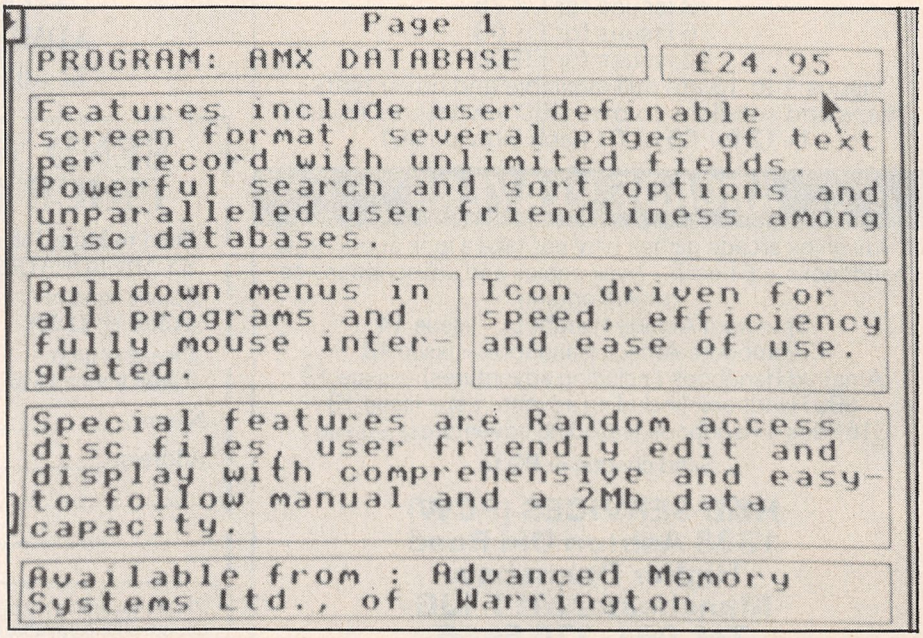
A database is simply a computerised version of a card index, or filing cabinet. The very fact that it is computerised gives you a degree of flexibility over manipulating its contents.

To explain, let's suppose, for the sake of argument, that you are the secretary of a computer club. You have a card index of all the members, and a program for one particular computer that you would specifically like all members who own that machine to know about. You go through the card index, removing all cards referring to members with that machine.

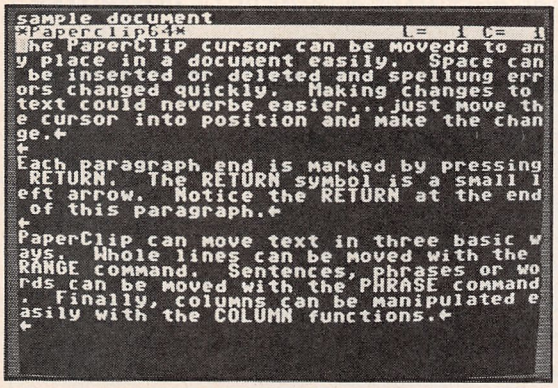
If that card index was on a computer database, with members' names, addresses, machines owned on it, you could simply ask the database for all members owning machine X, and it will do the job for you.

A database can be used not only for names and addresses, but to catalogue a stamp (or any other) collection, house contents, a mailing list if you run any sort of business from home – anything that would take up a lot of lists on scraps of paper.

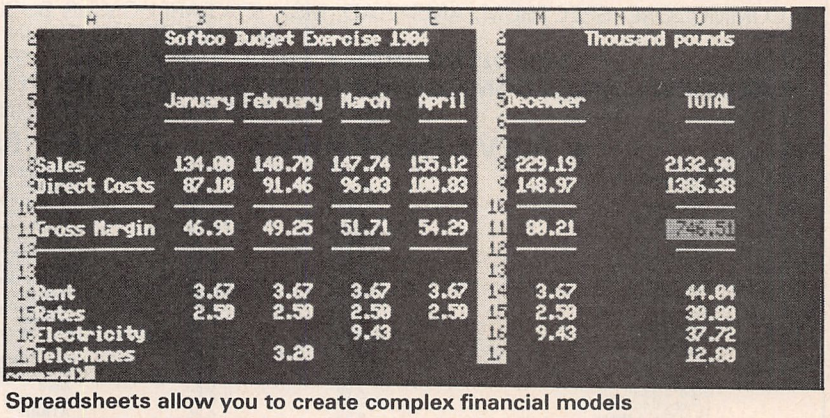
The most useful complementary program is a 'mail merge' package – so useful in fact, that several databases include mail merge facilities in the program. Mail merge gives you the facility to print out names, addresses and other information automatically. Simply choose



Databases give you easy access to information



C64 word processing – only 40 columns on screen



Spreadsheets allow you to create complex financial models

who the letters are to go to (all club members living in Manchester, for example) and specify that you want their addresses printed out. The program will do the rest.

Databases are available for all makes of home computer – the size of the machine's memory will mainly determine how sophisticated the products are, and big your database can be.

Personal finance

This is a tricky area. Personally I feel that if you cannot sort out your money on cheque stubs, you may be better off employing an accountant than a computer program. That said, if your finances are particularly complicated or you are involved in a small business, there are plenty of accounts programs available. Home accounting packages can also be useful for planning a budget for the next month/year/whatever.

What you will get beyond the facilities of the back of an envelope is instant calculation of your credits and debits, and the chance to easily add items you hadn't catered for at first.

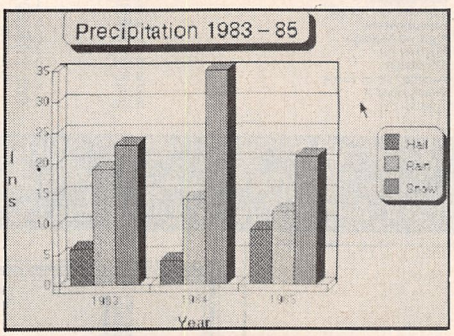
The subject of instant calculation and 'what if' conditions (ie, 'what if I allow 30p for Mars Bars once a week?') brings us neatly on to spreadsheets. This really is a domain where you'll need to be involved with a small business before even thinking of purchasing one, so we'll go over it briefly. A spreadsheet is a program which will make financial calculations on the spot and enable you to juggle around budgets until you find one that suits.

Controlling your home

The idea – mainly among non-computer owners – that computers should be able to turn your lights on and off, operate the burglar alarm/microwave, do the washing up, etc, is a popular myth, and one that needs largely dispelling. True, it's technologically possible, but the price/performance ratio of gadgets available (mostly in the US) is laughable.

Home computers as burglar alarm manipulators is an area which has been touched upon several times. The main problems are, a) the system will be extremely unwieldy, and b) you can't do anything else with the computer while it's frantically keeping burglars at bay.

The most interesting of such products is the recently launched Red Box (available for BBC, Spectrum and Commodore) from



Graph programs make numbers easier to understand

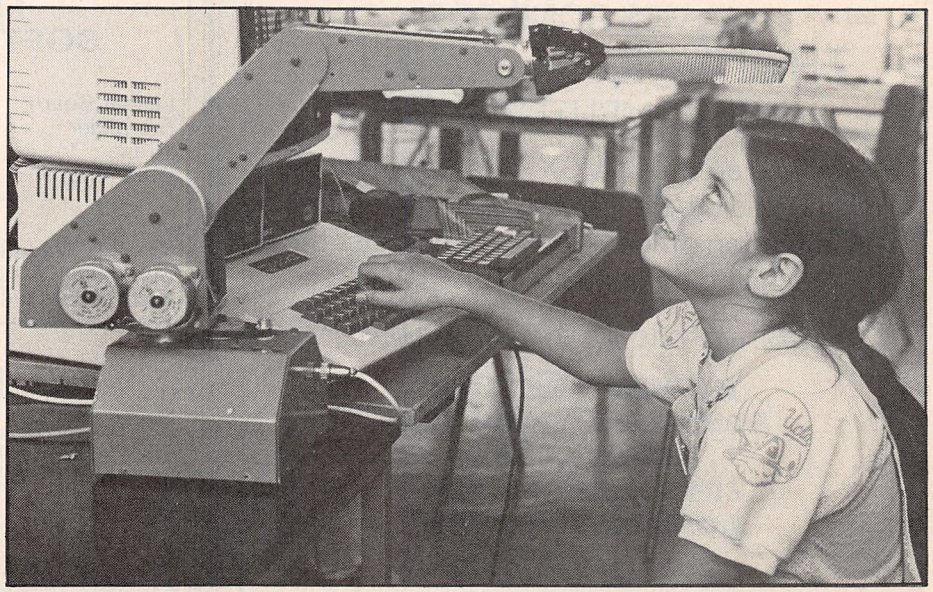
Electronic Fulfilment Services (see *Popular,* October 30 for full review). This will basically turn your lights on and off – should you be too lazy to do it yourself – but the add-on potential of the device, infra-red sensors for example, goes further than its predecessors.

Linked to the idea of home control is the field of robotics – this is the one where your computer controls the robot as it spring-cleans the house. Let it be said here and now that your home computer will not be able to do this, and if such a package appears in the next three years you almost certainly won't be able to afford it.

What are available now are devices such as robot 'arms' or 'buggies', which will move up and down and round about in preprogrammed sequences. They are almost exclusively used in educational establishments, although it's perfectly possible to buy them for the home if this subject really fascinates you.

The above is by no means an exhaustive list of what your computer can do for you, but an explanation of the applications you will hear and read most about. The range of more specialised 'minority' interests is well-catered for – anything from pools prediction programs (though there is no evidence that these are any better than any other way of forecasting eight score draws) to creating your own Christmas cards.

Keep an eye on the small advertisement columns in computer magazines to see what's around.



Robotics can be useful for the unspeakably lazy . . . and educational for the rest of us.

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Five Star Games	9.95	6.95
Cobra	9.95	5.55
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Avenger	9.99	6.95

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Space Harrier (disk)	14.95	10.50
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Disassembler 128

P W Norris

The second part of the listing follows. Once the machine code has been entered successfully it should be saved on tape after the main *Basic* program.

Position your tape correctly and enter *Save "c" Code 32000,1280.*

Listing 1

```
10 LET f=0
20 FOR a=32000 TO 33279 STEP 8
30 LET b=0
40 PRINT 'a+f;" : ";
50 FOR f=a TO a+7
60 INPUT x: PRINT x;" ";: LET b=b+x: N
EXT f
70 INPUT " Checksum : ";c
80 IF c<>b THEN  PRINT "Error ! Re-typ
e": GO TO 30
90 NEXT a
```

Data Listing

```
32000 60,28,28,29,39,41,29,251,=505
32008 42,30,39,28,30,47,28,31,=275
32016 47,28,29,47,49,21,28,28,=277
32024 61,40,40,42,37,39,29,42,=330
32032 251,31,39,28,30,48,28,31,=486
32040 48,28,29,48,49,22,28,28,=280
32048 32,28,56,29,38,41,29,252,=505
32056 42,30,38,28,30,45,28,31,=272
32064 45,28,29,45,49,23,28,28,=275
32072 47,28,56,42,37,38,29,42,=319
32080 252,31,38,28,30,46,28,31,=484
32088 46,28,29,46,49,25,28,28,=279
32096 47,51,56,29,37,41,29,60,=350
32104 37,30,37,28,30,43,28,31,=264
32112 43,28,29,43,49,24,28,28,=272
32120 47,52,56,42,37,37,29,37,=337
32128 60,31,37,28,30,44,28,31,=289
32136 44,28,29,44,49,63,28,28,=313
32144 47,53,56,29,50,41,29,60,=365
32152 42,30,50,28,30,253,28,31,=492
32160 253,28,29,253,49,26,28,28,=694
32168 47,54,56,42,37,50,29,42,=357
32176 60,31,50,28,30,42,28,31,=300
32184 42,28,29,42,49,27,28,28,=273
32192 29,47,47,29,47,48,29,47,=323
32200 45,29,47,46,29,47,43,29,=315
32208 47,44,29,47,253,29,47,42,=538
32216 29,48,47,29,48,48,29,48,=326
32224 45,29,48,46,29,48,43,29,=317
32232 48,44,29,48,253,29,48,42,=541
32240 29,45,47,29,45,48,29,45,=317
32248 45,29,45,46,29,45,43,29,=311
32256 45,44,29,45,253,29,45,42,=532
32264 29,46,47,29,46,48,29,46,=320
32272 45,29,46,46,29,46,43,29,=313
32280 46,44,29,46,253,29,46,42,=535
32288 29,43,47,29,43,48,29,43,=311
32296 45,29,43,46,29,43,43,29,=307
32304 43,44,29,43,253,29,43,42,=526
32312 29,44,47,29,44,48,29,44,=314
32320 45,29,44,46,29,44,43,29,=309
32328 44,44,29,44,253,29,44,42,=529
32336 29,253,47,29,253,48,29,253,=941
32344 45,29,253,46,29,253,43,29,=727
32352 253,44,33,28,28,29,253,42,=710
32360 29,42,47,29,42,48,29,42,=308
32368 45,29,42,46,29,42,43,29,=305
32376 42,44,29,42,253,29,42,42,=523
32384 42,42,47,42,42,48,42,42,=347
32392 45,42,42,46,42,42,43,42,=344
32400 42,44,42,42,253,42,42,42,=549
32408 55,42,47,55,42,48,55,42,=386
32416 45,55,42,46,55,42,43,55,=383
32424 42,44,55,42,253,55,42,42,=575
32432 53,47,28,53,48,28,53,45,=355
32440 28,53,46,28,53,43,28,53,=332
32448 44,28,53,253,28,53,42,28,=529
32456 56,42,47,56,42,48,56,42,=389
32464 45,56,42,46,56,42,43,56,=386
32472 42,44,56,42,253,56,42,42,=577
32480 43,47,28,43,48,28,43,45,=325
32488 28,43,46,28,43,43,28,43,=302
32496 44,28,43,253,28,43,42,28,=509
32504 54,47,28,54,48,28,54,45,=358
32512 28,54,46,28,54,43,28,54,=335
32520 44,28,54,253,28,54,42,28,=531
32528 48,47,28,48,48,28,48,45,=340
32536 28,48,46,28,48,43,28,48,=317
32544 44,28,48,253,28,48,42,28,=519
32552 45,47,28,45,48,28,45,45,=331
32560 28,45,46,28,45,43,28,45,=308
32568 44,28,45,253,28,45,42,28,=513
32576 51,51,28,49,39,28,46,51,=343
32584 41,46,28,41,44,51,41,50,=342
32592 39,28,42,42,49,34,28,28,=290
32600 51,28,52,51,28,28,46,52,=336
32608 41,28,30,28,44,52,41,44,=308
32616 28,41,55,42,49,35,28,28,=306
32624 51,53,28,49,38,28,46,53,=346
32632 41,58,49,42,44,53,41,50,=378
32640 38,28,53,28,49,36,28,28,=288
32648 51,54,28,59,28,28,46,54,=348
32656 41,57,42,49,44,54,41,28,=356
32664 31,28,52,42,49,37,28,28,=295
32672 51,55,28,49,37,28,46,55,=349
32680 41,61,254,37,44,55,41,50,=583
32688 37,28,43,49,28,38,28,28,=279
32696 51,61,28,46,253,28,46,61,=574
32704 41,59,38,37,44,61,41,28,=349
32712 32,28,54,49,28,39,28,28,=286
32720 51,29,28,49,40,28,46,57,=328
32728 41,28,28,28,44,29,41,50,=289
32736 40,28,48,49,28,40,28,28,=289
32744 51,58,28,29,50,37,46,58,=357
32752 41,62,28,28,44,30,41,28,=302
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32776 82,67,65,82,73,65,32,68,=534
32784 65,65,32,82,82,65,32,83,=506
32792 67,70,32,67,67,70,32,32,=437
32800 68,73,32,32,76,68,32,73,=454
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32816 74,78,90,72,65,76,84,82,=621
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32832 83,49,54,82,83,50,52,82,=535
32840 83,51,50,82,83,52,48,82,=531
32848 83,52,56,82,83,53,54,65,=528
32856 68,68,32,65,78,68,32,67,=478
32864 65,76,76,32,67,80,32,32,=460
32872 74,80,32,32,74,82,32,32,=438
32880 79,82,32,80,79,80,32,80,=544
32888 85,83,72,82,69,84,32,83,=590
32896 66,67,32,83,85,66,32,88,=519
32904 79,82,32,65,68,67,32,83,=508
32912 66,67,32,32,73,78,32,79,=459
32920 85,84,32,69,88,88,32,78,=556
32928 79,80,32,32,69,88,32,32,=444
32936 69,73,32,67,80,76,32,0,=429
32944 0,32,32,112,32,109,32,73,=422
32952 88,101,100,105,121,104,108,100,
=827
32960 101,98,99,72,76,68,69,66,=649
32968 67,65,70,78,78,65,32,72,=527
32976 32,76,32,68,32,69,32,66,=407
32984 32,67,32,78,32,83,80,78,=482
32992 90,90,32,78,67,67,32,80,=536
33000 79,68,83,43,32,45,32,115,=497
33008 112,110,110,80,69,0,0,0,=481
33016 0,0,48,48,57,48,48,50,=299
33024 53,49,48,51,51,49,48,51,=400
33032 53,50,48,52,49,51,48,52,=403
```

continued on page 38 ▶

Programming: Spectrum 128

◀ continued from page 37

```
33040 50,51,48,52,51,52,48,53,=405
33048 55,53,50,50,53,48,50,50,=409
33056 55,49,50,50,57,50,50,51,=412
33064 51,51,50,52,57,52,48,51,=412
33072 52,51,48,53,50,50,48,53,=405
33080 51,50,48,53,52,51,48,55,=408
33088 48,48,48,55,56,49,48,56,=408
33096 54,50,48,57,52,51,49,48,=409
33104 50,52,49,49,48,53,49,49,=399
33112 50,49,49,49,51,50,49,49,=396
33120 52,51,49,49,53,52,49,49,=404
33128 54,53,49,49,55,54,49,49,=412
33136 57,55,49,50,54,49,49,51,=414
33144 52,50,49,52,50,51,49,53,=406
33152 48,52,49,53,56,53,49,54,=414
33160 54,54,49,55,52,55,49,56,=424
33168 50,56,49,57,48,57,50,48,=415
33176 51,51,1,114,108,99,114,114,=652
33184 99,114,108,32,114,114,32,115,=728
33192 108,97,115,114,97,32,32,32,=627
33200 115,114,108,206,11,228,32,98,=912
33208 32,32,32,99,32,32,32,100,=391
33216 32,32,32,101,32,32,32,104,=397
33224 32,32,32,108,32,32,40,104,=412
33232 108,41,32,97,32,32,82,98,=522
33240 105,116,114,101,115,115,101,116,=883
33248 87,113,14,243,32,48,44,32,=613
33256 49,44,32,50,44,32,51,44,=346
33264 32,52,44,32,53,44,32,54,=343
33272 44,32,55,44,0,0,0,0,=175
```

Programming: Amstrad CPC

Khandal

Ian Grainger

The final chapter of Khandal now unfolds. Last week saw the end of the Basic listing so now we move onto the sprite data and machine code. Type in the hexloader and run it. Then start entering all the data which, once it is error free, should be saved after the main listing. And away you go (hopefully).

To get a copy of Khandal on cassette send £3 to Ian Grainger, 33 Wellfield Road, Wingate, Co Durham, Cleveland.

Listing 1

```
10 MODE 2:FOR add=&6000 TO &6440 STEP 16
20 PRINT"Enter line :";HEX$(add,4);": ";
:INPUT he$
30 IF LEN(he$)<>32 THEN PRINT "Wrong amo
unt of data. Try again.":GOTO 20
40 INPUT "Enter checksum ";ch$
50 ch=0:FOR f=1 TO LEN(he$) STEP 2
60 by=VAL("&"+MID$(he$,f,2)):ch=ch+by
70 POKE add+(f/2)-1,by:NEXT
80 IF ch<>VAL("&"+ch$) THEN PRINT "Total
ks incorrect. Try again.":GOTO 20
90 NEXT:PRINT "Insert cassette to save d
ata after main program."
100 SAVE "data",b,&6000,1088
```

Listing 2

```
6000 : 00030F0000070F0800430F0C00E10F0E = 18C
6010 : 00A10F0E06A10F0E0F4B0F0E0F0F0F0E = 234
6020 : 070D0F0C000B1E0C00077B0B00B8F000 = 293
6030 : 00FFFF0000F8F0800070F0800070B080 = 7E6
6040 : 0070D08000F0D0C000F0E0C000F0E0C0 = 960
6050 : 00F0E0C000F0E0C00070E0C00077EF0C = 8A2
6060 : 0070E10B0070F0B00030F0000030F000 = 579
6070 : 0000E0000000E0000011EE0000000000 = 2BF
60B0 : 00030F0000070F0800430F0C00E10F0E = 18C
6090 : 00A10F0E06A10F0E0F4B0F0E0F0F0F0E = 234
60A0 : 070D0F0C000B1E0C00077B0B00B8F000 = 293
60B0 : 00FFFF0000F8F0800070F0C00070D0E0 = 8A6
60C0 : 0070E0F000F0F07000C308E000C37B80 = 7F6
60D0 : 00F0084000F0F0C00070F0C00077FFCC = 83A
60E0 : 0070D0B00070D0B000F0B0B000F070F1 = 7F1
60F0 : 10E030F110C000F133CC001100000000 = 4E2
6100 : 000F0C00010F0E00030F2C00070F7B00 = 105
6110 : 070F5B00070F5B06070F2D0F070F0F0F = 168
6120 : 030F0B0E03870D0001E10E0000F0D100 = 373
6130 : 00FFFF0010F0F10010F0E00010D0E000 = 78F
6140 : 10B0E00030B0F0003070F0003070F000 = 690
6150 : 3070F0003070F0003070E000037FEE00 = 610
6160 : 0178E00010F0E00000F0C00000F0C000 = 699
6170 : 007000000070000000778B0000000000 = 1DF
6180 : 000F0C00010F0E00030F2C00070F7B00 = 105
6190 : 070F5B00070F5B06070F2D0F070F0F0F = 168
61A0 : 030F0B0E03870D0001E10E0000F0D100 = 373
61B0 : 00FFFF0010F0F10030F0E00070B0E000 = 7EF
61C0 : F070E000E0F0F00070013C0010E13C00 = 6DA
61D0 : 2001F00030F0F00030F0E00033FFEE00 = 741
61E0 : 10B0E00010B0E00010D0F000FBE0F000 = 7D8
61F0 : F8C0708F8003080B80033CC000000000 = 5D7
6200 : 00330000000077BB000000CCBB000000 = 286
6210 : CCBB00000099CC000011BBEE0000118A = 50E
6220 : 0A0000118B060000118B0E000011010C = 174
6230 : 000000471F000011FFFFCC0033FFFFEE = 660
6240 : 0077FFFFFF00FFBBEEFF884C33EE1108 = 929
6250 : 0B10C00008B033EE00000077FF000000 = 377
6260 : FFFF8B0000FFFF8B0000FFFF8B000077 = 809
6270 : FF000000070700000007070000000306 = 124
62B0 : 000000030600000003060000000020200 = 16
6290 : 00002623000000CC1188000000071FFE8 = 406
62A0 : 00F9FFF911FEFFF733FFF6FF77FFF9BB = C47
62B0 : 7777FF99EE77FF994C33FFCC0833FFCC = 9D3
62C0 : 0071FFCC0070F0C00031FFCC003399CC = 7F0
62D0 : 003399CC003300CC007700EE007700EE = 561
62E0 : 007700EE006600660066006600060006 = 309
62F0 : 000E0007010C0003000000000000000000 = 25
6300 : 00000E000000010F0000000105000000 = 24
6310 : 010B000000010B000000000E00000011 = 37
6320 : 1F00000071FFE80000F9FFF90011FEFF = 776
6330 : F78833FFF6FF8877FFF9BBCC7777FF99 = BAA
6340 : CCEE77FF99CC4C33FFCCCC0833FFCCBC = A3D
6350 : 0071FFCC040070F0C0000031FFCC0000 = 65C
6360 : 3399CC00003399CC00003300CC000077 = 4A6
6370 : 00EE00007700EE00007700EE00006600 = 41E
6380 : 66000066006600000600600000E0007 = 153
```

continued on page 39 ▶

◀ continued from page 38

```
6390 : 00010C00030B0000000000000000000000 = 18
63A0 : 00070F0E00000F0F0F00010F0F0F0803 = 8A
63B0 : 3C0FC30C037896E10C037896E10C0378 = 591
63C0 : 96E10C034B96210C034B96210C033C0F = 3ED
63D0 : C30C030F0F0F0C030F0F0F0C010E0007 = 15D
63E0 : 08110F0F0F8B338F0F1FCC77FFFFFFEE = 6EC
63F0 : FFFF99FFFFFFFF99FFFFEEFFFFFF77EE = E7A
6400 : FF99FF77EE7799EE77EE33FFCC77FF77 = B4A
6410 : FFEEFFFF77FFEEFF7777FFEEEE77BBFF = D48
6420 : DDEE33DDFFBBCC11BB99DD88003300CC = 92A
6430 : 00003300CC00000F090F000000000000 = 126
6440 : 00000000000000000000000000000000 = 0
```


Fastline

David J Perry

The standard QL contains a variety of commands for handling graphics, and although these commands are powerful their speed is hampered by the need for them to be drawn relative to individual windows and scales.

The following program adds extra graphics procedures to Superbasic which operate relative to the whole QL screen and a set scale of 256 × 256. These new commands have a speed increase of up to 20 times faster than the standard Superbasic commands.

The scale for all the commands is 256 × 256 with 0,0 at the top left of the screen and 256,256 at the bottom right of the screen. The additional faster commands are:

FLine: Same function as Superbasic *Line.*
FLine R: Same function as Superbasic *Line_R.*
FPoint: Same as Superbasic *Point.*
FLink: Set the ink colour used by the new commands.

```
050 REMark QL FASTLINE 1986 by David J Perry
100 start=RESPR(426)
110 CLS
115 RESTORE
120 check=0
130 length=426
140 pos=500
150 byte=start
160 bad=0
170 REPeat loop
180 REPeat readit
190 READ datano
200 IF datano<0 THEN EXIT readit
210 check=check+datano
220 POKE byte,datano
230 byte=byte+1
240 END REPeat readit
250 IF check<>-datano THEN
260 bad=1
270 EXIT loop
280 END IF
290 check=0
300 IF byte >= length+start THEN EXIT  loop
310 pos=pos+10
320 END REPeat loop
330 IF bad=1 THEN baddata:STOP
340 saveyesno
345 CALL start
350 STOP
355 DEFine PROCedure baddata
360 PRINT'Error at line ';pos
380 END DEFine  baddata
390 DEFine PROCedure saveyesno
410 INPUT 'Save code as MDV file (y/n) ? ';y$
420 IF y$(1)='n' THEN END DEFine saveyesno
430 INPUT 'MDV name (inc mdv1_ e.t.c.) ';name$
440 DELETE name$
450 SBYTES name$,start,length
460 END DEFine saveyesno
500 DATA 48,120,1,16,67,250,0,6,78,144,-730
510 DATA 78,117,0,4,1,60,4,70,73,78,-485
520 DATA 75,0,0,34,7,70,76,73,78,69,-482
530 DATA 95,82,0,78,5,70,76,73,78,69,-626
540 DATA 1,82,6,70,80,79,73,78,84,0,-553
550 DATA 0,0,0,0,0,0,48,120,1,24,-193
560 DATA 78,144,102,0,0,214,112,241,12,67,-970
570 DATA 0,2,102,0,0,204,73,250,1,92,-724
580 DATA 24,172,0,2,25,108,0,3,0,1,-335
590 DATA 18,54,152,3,20,54,152,7,211,44,-715
600 DATA 0,2,213,44,0,3,97,48,78,117,-602
610 DATA 48,120,1,24,78,144,102,0,0,160,-677
620 DATA 112,241,12,67,0,4,102,0,0,150,-688
630 DATA 73,250,1,38,24,182,152,3,25,118,-866
640 DATA 152,7,0,1,25,118,152,11,0,2,-468
650 DATA 25,118,152,15,0,3,97,122,38,60,-630
660 DATA 0,1,0,1,18,44,0,2,146,20, 232
670 DATA 100,4,68,1,68,3,72,67,20,44,-447
680 DATA 0,3,148,44,0,1,100,4,68,2,-370
690 DATA 68,3,16,1,128,2,103,78,40,3,-442
700 DATA 16,2,176,1,101,10,2,132,0,0,-440
710 DATA 255,255,195,66,96,6,2,132,255,255,-1517
720 DATA 0,0,66,71,30,1,83,7,28,1,-287
730 DATA 226,14,16,6,208,2,101,4,176,1,-754
740 DATA 101,8,144,1,28,0,42,3,96,4,-427
750 DATA 28,0,42,4,219,44,0,1,72,69,-479
760 DATA 219,20,72,231,124,0,97,12,76,223,-1074
770 DATA 0,62,81,207,255,214,66,128,78,117,-1208
780 DATA 18,20,24,1,26,44,0,1,54,44,-232
790 DATA 0,4,226,12,2,68,0,126,42,124,-604
800 DATA 0,2,0,0,218,196,239,77,218,197,-1147
810 DATA 2,1,0,3,227,9,52,60,127,63,-544
820 DATA 226,122,226,123,197,85,135,85,78,117,-1394
830 DATA 48,120,1,24,78,144,102,196,112,241,-1066
840 DATA 12,67,0,1,102,188,73,250,0,78,-771
850 DATA 22,54,152,3,237,75,56,3,239,76,-917
860 DATA 2,68,128,0,2,67,0,192,134,68,-661
870 DATA 57,67,0,4,66,128,78,117,48,120,-685
880 DATA 1,24,78,144,102,148,112,241,12,67,-929
890 DATA 0,2,102,140,73,250,0,30,24,182,-803
900 DATA 152,3,25,118,152,7,0,1,66,128,-652
910 DATA 97,0,255,124,25,84,0,2,25,108,-720
920 DATA 0,1,0,3,78,117,76,176,0,0,-451
```

Control Stripper

J Henson

This program solves the problem of printers not being able to cope with embedded control characters 129–137 by substituting *<f1>, <f2>* etc.

The way this is done is by altering the Write Character Vector (WRCHV) through which all calls to the operating system Write Character Routine are directed.

Once run the machine code should be saved with **Save ''codemc'' D00 D30,* then, when you want to use the routine, re-load it and enter *?&20E=0:?&20F=&D* before listing the target program.

```
  10 MODE 7
  20 lo=?&20E : hi=?&20F
  30 oswrch= hi*256 + lo
  40 FOR I%=0 TO 2 STEP 2
  50 P%=&0D00
  60 [OPT I%
  70 STA &70
  80 LDA #129
  90 CMP &70
 100 BEQ over
 110 BCS skip
 120 .over
 130 LDA #137
 140 CMP &70
 150 BCC skip
 160 LDA #ASC"<" : JSR oswrch
 170 LDA #ASC"f" : JSR oswrch
 180 LDA &70
 190 SEC
 200 SBC #80
 210 JSR oswrch
 220 LDA #ASC">" : JSR oswrch
 230 JMP return
 240 .skip
 250 LDA &70 : JSR oswrch
 260 .return
 270 RTS
 280 ] : NEXT
 290 PRINT"Codeprint program program no
w installed."'
 300 A$=STR$(lo):B$=STR$(hi)
 310 C$="K.8?&20E="+A$+":?&20F="+B$+"|M
"
 320 OSCLI(C$)
 330 *K.9?&20E=&00:?&20F=&0D|M
 340 PRINT"Keys: f8-disable f9-enable."
 350 PRINT'"Demonstration:"
 360 PRINT'"Codeprint disabled"
 370 FOR I%=129 TO 137
 380 IF I%=133:PRINT
 390 VDUI%,42:NEXT
 400 PRINT''"Codeprint enabled"
 410 ?&20E=&00:?&20F=&0D
 420 FOR I%=129 TO 137
 430 IF I%=133:PRINT
 440 VDUI%,42:NEXT
 450 PRINT''"Press space to NEW the pro
gram."''
 460 PRINT"NB. the Codeprint utility wi
ll remain   intact after NEW but will ha
ve to be    enabled again after BREAK wi
th f9."
 470 A=GET
 480 *FX138,0,78
 490 *FX138,0,69
 500 *FX138,0,87
 510 *FX138,0,13
 520 END
```

PROGRAMMERS GAMES DESIGNERS REQUIRED

We are currently working on a number of new games and now plan to add further projects to our release schedule.

At present we are specifically looking for the following people:-

A Full-time Senior Programmer

We need an experienced games programmer to team up with one of our artists to form a new in-house design/programming team.

The job involves working together to see games from the initial conception of an original idea through design and programming. Initially working on the Amiga and ST, as a Senior Programmer you will also be overseeing programming of C64, Amstrad and Spectrum versions.

You will need to be fully experienced in machine code and already have programmed at least one arcade/action style game for the Spectrum, C64 or Amstrad. A good eye for games design is essential as well as a friendly personality and sense of humour!

The job is based at our Central London offices. Salary will be based on previous experience. In addition a royalty is paid on sales of games. Applicants should be at least 19 years of age.

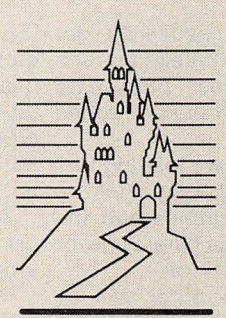
Freelance programmers/designers

We are very interested in publishing games written and programmed by freelance design and programming teams.

You will probably be working within the business with involvement in games already published by other companies and now want to further establish your name and reputation. You will need to have the experience to see projects through from initial idea to finished programme.

If you feel you are a talented and experienced programmer/designer – working as an individual or a team – with exciting and original ideas, we would like to talk to you.

In either case phone Pete Stone at Palace Software on 01-278 0751 and tell him all about yourself.



PALACE software

Page lister

Alastair Scott

This program for any Amstrad CPC prevents long listings and output from scrolling off the screen without you having a chance to read them.

:Page.on makes the screen stop every 25 lines until *Tab* is pressed.

:Page.off returns to normal.

```
100 'Paged Listings
110 'by Alastair Scott
120 MODE 1:MEMORY &A0FF
130 KEY DEF 68,1,0,0,0
140 FOR a=&A100 TO &A178
150 READ b$:POKE a,VAL("&"+b$):c=c+PEEK(a)
160 NEXT
170 IF c<>&3F38 THEN PRINT CHR$(7)"Error in d
ata!":END
180 CALL &A100:PRINT"|PAGE.ON and |PAGE.OFF c
ommands OK."
190 DATA 21,79,A1,CB,56,C0,CB,D6,2A,5B,BB,22
200 DATA 41,A1,01,17,A1,21,7A,A1,C3,D1,BC,1F
210 DATA A1,C3,2F,A1,C3,3B,A1,50,41,47,45,2E
220 DATA 4F,CE,50,41,47,45,2E,4F,46,C6,00,3E
230 DATA C3,32,5A,BB,21,47,A1,22,5B,BB,C9,3E
240 DATA CF,32,5A,BB,21,FF,FF,22,5B,BB,C9,C5
250 DATA D5,E5,F5,CD,78,BB,7C,FE,02,CC,62,A1
260 DATA CD,3B,A1,F1,CD,5A,BB,CD,2F,A1,E1,D1
270 DATA C1,C9,3E,FF,3C,FE,18,D4,6E,A1,32,63
280 DATA A1,C9,F5,3E,44,CD,1E,BB,28,F9,F1,AF
290 DATA C9
```

Auto Run

Ian Bowker

This routine for the QL makes ordinary Basic listings automatically run when loaded.

To use simply run the utility and enter the program's name when prompted. From now on it will auto-run when loaded.

```
10 MODE 4:INK 7:PAPER 0:PRINT "PROGRAM AUTO RUNNER"
20 PRINT #2:INK #2,0:PAPER #2,7
30 INPUT #2,"ENTER THE COMPLETE FILENAME OF THE PROGRAM (INCLUDING THE D
EVICE NAME E.G. MDV1_FRED) ";A$
40 OPEN #4,A$
50 IF EOF(#4):GO TO 70
60 B$=INKEY$(#4):PRINT B$;:GO TO 50
70 PRINT #4,"RUN":CLOSE #4:INK #0,4:PAPER #0,0:PRINT #0,"THE PROGRAM WIL
L NOW AUTO RUN WHEN LOADED WITH THE LOAD COMMAND"
```

Free Memory

Alastair Scott

This program for any Amstrad CPC provides a constant interrupt driven display of free and occupied memory in the top left of the screen.

|*Free* turns the display on.

|*Normal* turns it off.

```
120 MODE 1:MEMORY &A3FF
130 FOR a=&A400 TO &A512
140 READ b$:POKE a,VAL("&"+b$):c=c+PEEK(a)
150 NEXT
160 IF c<>33363 THEN PRINT CHR$(7)"ERROR IN D
ATA!":END
170 CALL &A400:PRINT"|FREE and |NORMAL comman
ds OK."
180 DATA 21,1D,A5,06,81,11,48,A4,CD,EF,BC,CD
190 DATA 00,B9,F5,3A,02,C0,A7,C4,9D,A4,F1,CD
200 DATA 06,B9,01,23,A4,21,13,A5,C3,D1,BC,2B
210 DATA A4,C3,36,A4,C3,42,A4,46,52,45,C5,4E
220 DATA 4F,52,4D,41,CC,00,21,17,A5,01,19,00
230 DATA 11,19,00,C3,E9,BC,21,17,A5,C3,EC,BC
240 DATA CD,78,BB,22,8E,A4,3E,07,CD,B4,BB,32
250 DATA 89,A4,3E,1E,CD,5A,BB,21,B0,A4,CD,93
260 DATA A4,2A,89,AE,ED,5B,81,AE,ED,52,CD,BD
270 DATA A4,21,B6,A4,CD,93,A4,2A,7B,AE,ED,5B
280 DATA 89,AE,ED,52,CD,BD,A4,06,05,3E,20,CD
290 DATA 5A,BB,10,F9,3E,00,CD,B4,BB,21,00,00
300 DATA C3,75,BB,7E,CB,7F,C0,CD,5A,BB,23,18
310 DATA F6,3E,6C,32,62,A4,32,78,A4,3E,64,32
320 DATA 66,A4,3E,5E,32,74,A4,C9,55,53,45,44
330 DATA 20,FF,20,46,52,45,45,20,FF,7C,B5,28
340 DATA 20,AF,32,01,A5,11,10,27,CD,E6,A4,11
350 DATA E8,03,CD,E6,A4,11,64,00,CD,E6,A4,1E
360 DATA 0A,CD,E6,A4,1E,01,C3,E6,A4,3E,30,C3
370 DATA 5A,BB,AF,37,3F,ED,52,38,03,3C,18,F7
380 DATA 19,FE,01,D4,0B,A5,FE,00,28,05,C6,30
390 DATA C3,5A,BB,F5,3E,00,FE,FF,20,03,F1,18
400 DATA F1,F1,C9,F5,3E,FF,32,01,A5,F1,C9,00
```

We want your programs!!

Yes, this is your chance to get rich and famous. Well, famous anyway, as *Popular Computing Weekly* is looking for contributions to the Programming pages.

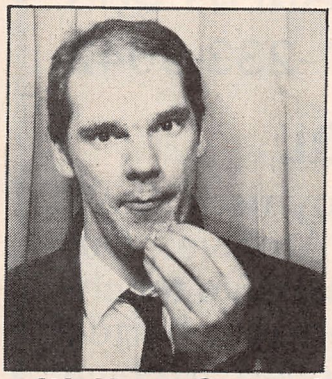
What sort of thing are we looking for? You name it – anything original from games to utilities, applications and the like, written in Basic, machine code or anything else you can think of.

Programs for any computer will be considered, not just the old faithfuls (Spectrum, Amstrad, QL, Commodore, etc), so send those listings in. What we need is a working copy of the program on tape or disc, plus an accompanying article or documentation that you would anticipate going with the piece, normally not over 2000 words.

Alternatively, send in your short programs to the Bytes and Pieces page – what could be easier?

In return, we'll pay the princely sum of £25/page for the main programming pages and £10 for each Bytes & Pieces contribution we publish. Plus the fact that your name will be indelibly carved in the *Popular* Programming Hall of Fame till time immemorial. What more could any true programmer ask?

Just send your masterpieces in to **Duncan Evans, Technical Editor, Popular Computing Weekly, 12–13 Little Newport St, London WC2 7PP** and he'll assess them post haste.



with Kenn Garroch

64 graphics

R Downs, of Harwich, Essex, writes:

Q Having been given a Commodore 64 for Christmas, I am having a little trouble accessing some of the more obscure functions of the machine, mainly the graphics. I gather that on most other machines, these are accessed via commands from Basic. The Commodore seems to lack these but I know that its graphics capabilities are excellent. Could you explain how to plot a point in high resolution mode?

A The first thing to note about the 64 is that all of the graphics are controlled via the Vic II chip. This gadget contains a number of registers that allow sprites and graphics to be set up and used. The registers you will need are:

VIC=53248	Base address of Vic chip
VIC+17	Bitmap control (among other things)
VIC+24	Screen and character base addresses
56576	Vic chip memory bank select

The Vic chip can position the screen at a number of places in Ram first of all in four banks selected with bits zero and one of 56576: 0, 16384, 32768, 49152 corresponding to 3,2,1,0 in 56576. The complete address of the screen is found with the following addresses:

Screen start or colour: B1 B0 VR13 VR13 VR11 VR10 0 0 0 0 0 0 0 0 0 0
Char defs or Bitmap: B1 B0 CD13 CD12 CD11 0 0 0 0 0 0 0 0 0 0 0

Where B1 and B0 are the least significant two bits of 56576 note that they are inverted, so 1 becomes 0.

The VR and CD bits are in 53272 (VIC+24):
53272==>VR13 VR12 VR11 VR10 CD13 CD12 CD11 1

Note that the least significant bit is always set to one.

So, to set up the Bitmap at 24576 (bank starts at 16384) and colour Ram at 23552, use the following pokes:

```
10 POKE 53265,PEEK(53265) OR 32:REM BITMAP MODE, BIT 5=1
20 POKE 56576,2:REM SELECT VIC BANK 1 (BITS INVERTED)
30 POKE 53272,121:SCREEN BITMAP 24576, COLOUR 23552
```

This works out at B0=1, B1=0 selecting bank 1

53272=01111001 so VR13-VR10=0111 and CD13-CD11=100 thus the complete 16 bit address for the start of the bitmap is:

0110 0000 0000 0000=24576

and the colour Ram at:

0101 1100 0000 0000=23552

Note that the colour Rams is in two sections, the low and high nybbles of the addresses 23552-23552+1000 allowing each block of 8x8 to be a different colour.

To plot a point onto the Bitmap needs a little knowledge of how it is laid out, this is as follows:

If set up as above, it starts at 24576.

24576 24584 for 40 blocks of eight across
24577 24585
24578 24586
24579 24587
24580 24588
24581 24589
24582 24590
24583 24591
next row of 40 blocks starting at 24896
for 25 rows down

Each byte holds eight pixels the least significant of which (bit 0) is the right hand pixel of the set. So add:

```
40 FOR T=0 TO 7999:POKE T+24576,0:NEXT
50 FOR T=0 TO 1000:POKE T+23552,16:NEXT
60 POKE 24576,128
```

And the display will show a single white pixel in the top left of the screen Line 40 is used to clear the bitmap to zero and line 50 sets the colours to white on black. Line 60 puts the pixel onto the screen.

To actually plot a point anywhere on the screen is a little more complex but the following addition does the trick. It is a little slow in Basic and should really be written in machine code.

```
60 FOR Y=0 TO 100
70 X=Y
80 GOSUB 500
90 NEXT
100 END
499 REM PLOT X,Y
500 M=INT(Y/8)*320 :REM LINE START
510 N=(INT(X/8)*8)+(Y-(INT(Y/8)*8))
    :REM BYTE OFFSET
520 P=INT(X-(INT(X/8)*8))
530 P=2□(7-P) :REM PIXEL MASK
540 POKE M+N+24576,PEEK(M+N+24576)
    OR P :BITS TO SCREEN
550 RETURN
```

A Basic question

J Hart of Northwich, Cheshire, writes:

Q Could you settle an argument by telling me what Basic stands for?

A Simple. Beginners All-purpose Symbolic Instruction Code.

Gissa job!

M Palmer of New Cross, London, writes:

Q I have read adverts in a number of computer magazines asking for applicants for games programmer jobs. What qualifications would I need to apply for one of these? I do have a keen interest in programming and have written a few games in machine code for my Spectrum (none of them have ever been published).

A Most of the programming houses seem to want previous experience and a game published certainly counts here. However, this may not be the case with all of them and the best thing to do would be to reply to one or two of the adverts and ask them if they would like to see some of your work.

It might also be an idea to do a bit of research and find out what other games the company has published, firstly to see if it suits your style, and secondly for you to judge if they are any good.

As far as qualifications go, there are no written exams on the art of games programming. Experience with a couple of microprocessors, say 6502 and Z80 or 68000, would certainly help and some artistic or musical ability would be a bonus. The main things, however, are to be able to think up original ideas, put them into practice, and have a good idea of what games have been done before.

Silent Sid

M Neilson, of Brecon, Powys, writes:

Q I have a Commodore 64 and have been trying to get some sounds out of the Sid chip. Everything works fine except that every so often, the noise output fails to work. I have tried everything but it still happens, usually after I have been using that voice for one of the other wave forms. Is there some really obvious answer?

A All that is happening is that the noise sometimes fails to trigger since the chip doesn't reset itself properly after a change of waveform, especially when using noise. The solution is quite easy; all you do is set the test bit in the control register of the particular voice, before you gate it. So set up the sound chip as follows:

```
10 SI=54272:REM BASE ADDRESS FOR SOUND CHIP
20 POKE SI+1,32:REM PITCH
30 POKE SI+4,32:REM TRIANGLE WAVE
40 POKE SI+5,10:DECAY
50 POKE SI+24,15:VOLUME
60 POKE SI+4,33:TRIGGER
```

And run the program. You will get a ping sound with the triangle waveform. If you now change line 30 to *Poke SI+4,128,* ie, set up for noise, and line 60 to *Poke SI+4,129,* nothing will happen (not always). If you change line 30 to *Poke SI+4,136,* which sets up for noise and also sets the test bit, the noise will work every time. Setting, then clearing (line 60 remains *Poke SI+4,129)* the test bit resets the voice waveform properly.

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Distant drums and ST synthesisers

Mark Jenkins has information on new musical packages for the Amiga, plus a more detailed look at EZ-Track ST

Anybody out there with an Amiga? If so, pay attention, because the music world has finally caught up with you.

There have already been a couple of music products for the Amiga, notably from Ariolasoft who marketed a versatile auto-composer for the powerful FM-like built-in sounds a few months back. But overall there has been great reluctance to get involved with the machine, despite the fact that it has the graphics and processing power to create a very flashy package indeed. Its multi-tasking capabilities would theoretically allow it to go on playing a sequence while you're recording a new pattern or loading another sequence, or allow you to edit a sound while a pattern is still playing.

That's assuming that somebody writes the software. At least it's now possible to buy a Midi interface for the Amiga from Skyles Electric Works of Mountain View, California. It has two Midi Out ports, one Midi In and one Midi Thru, and is surprisingly inexpensive at £49.95, including Vat.

The interface is compatible with software currently on release in the States and the new UK distributor Supersoft is likely to come up with its own software package before long. However, if anyone is interested in getting hold of some software right now, let me know and I'll see what I can find out.

Rhythm King

On a more downmarket front, the Supersoft *Rhythm King Pro* cartridge has been selling well, offering as it does digitised drum sounds on the Commodore 64 for a mere £39.95. But with recent software-only releases it's become obvious that something simpler is also called for, and so the new *Rhythm King* software-only package has been introduced at £14.95.

We haven't seen the software-only *Rhythm King* yet, but Supersoft claims that it's virtually identical in operation to the hardware version, coming on disc or tape for the 64 and C128. Supersoft's *Microvox* sampler has been used to create a new set of sounds with suitable filtering applied, so they reproduce well even through the Commodore's Sid sound chip.

Versions for C64 and C128 are included with the package, the latter running in 40-column 128 mode. *Rhythm King Pro* is also still available, and you can get more information on both versions and on the Amiga interface from Peter Calver at the Supersoft address below.

On to the Atari 520 with the promised in-depth look at *EZ-Track ST,* the 20-track polyphonic Midi composer from Hybrid Arts. Available now through Syndromic Music, *EZ-Track* is a basic composer which has only one screen and is always ready to record.

Down the left of the screen you'll find the twenty tracks listed as follows;

```
> 01 Soprano
  ↑E ! C 1 p 14%
```

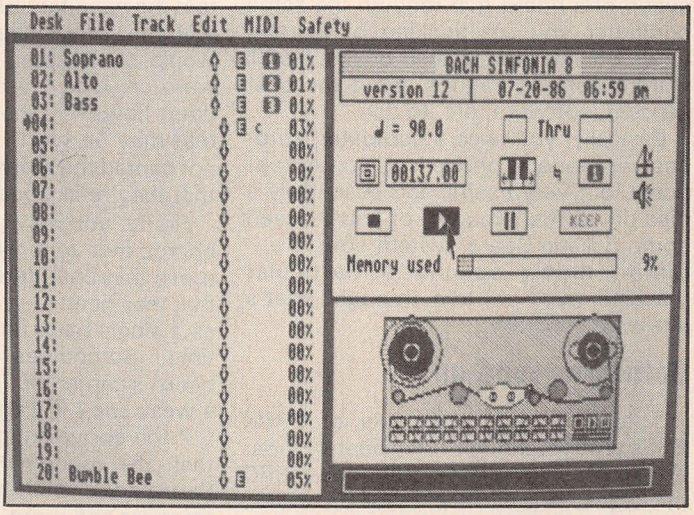
These symbols represent the cursor which shows the current track being used; the track number; the track name; on/off status (the arrow is inverted for Off); the End Of Track symbol which appears when a track finishes playback; the Activity indicator which shows how many notes are playing on the track using various symbols (! means one note); the "changed since last save" indicator; the Midi channel; the Protected symbol; and the amount of memory used.

Pretty comprehensive for a single line; these parameters are, of course, changed using the top-of-the-screen commands which are *Desk, File, Track, Edit, MIDI* and *Safety. File* has the options *Load, Save As . . . , Update, Delete, Format Disc, Drive Number* and *Quit,* while *Track* has the options *Name, Protect/Unprotect* and *Delete.*

So if we select the first track and set it to Midi Channel 1, we're ready to record simply by starting the metronome and playing the connected synthesiser. All data including notes, velocity, wheel pedal and patch changes are recorded, and if you want to keep the results of your performance you go over to the right hand side of the screen and click on *Keep.*

Name the track if you like, then select and overdub another track and name the resulting Song. You can then save to disc using *Save As . . .* with a name up to 12 letters long.

Looking at the right-hand control section of the screen we see a display for tempo, and various other functions. Song information on save the song, plus the date and time it was saved (provided you set up the micro's software control panel at the start of the session), plus play/record which can also be controlled by the space bar.



Hybrid Arts EZ-Track ST operating screen

Next time we'll show how the right-hand section of the *EZ-Track ST* screen is used to transpose and otherwise control a track or a complete song.

Supersoft, Winchester House, Canning Road, Wealdstone, Harrow, Middlesex HA3 7SJ. 01-861 1166.
Syndromic Music, 24–26 Avenue Mews, London N10 3NP. 01-444 9126.

If you have any queries or tips for this column, please write to Mark Jenkins at *Popular Computing Weekly,* 12–13 Little Newport Street, London WC2H 7PP. Mark would also welcome examples of your own music on audio or program tape, or disc.

Under the baud walk

David Wallin answers questions on Bulletin Board Software available and clarifies confusion over comms parities available

More letters and queries to be answered this week.

Firstly, Simon Jones wants to know how to go about starting your own BB. I answered this one briefly a couple of weeks ago and I will go into it in more detail in a later column.

The best way to start is to contact the sysop of a board that runs on the same computer you are thinking of starting yours on and picking their brains. You'll want recommendations about the best modem, software, etc, to use.

Basically, you need a computer, auto-answer modem, phone line, printer (optional, but very useful) and essentially a disc drive. Also you will of course need some Bulletin Board system software – Simon didn't specify a particular machine, so I will run through what's available generally.

Software round-up

There are quite a number of CP/M BBSs around, though unfortunately most are expensive. There are a few BBC packages around, ie, NBBS, FBBS, OBBS, CommunITel (though some are not exactly bug-free, eg, FBBS). Contacting a board running on a particular piece of software will tell you what the HQ number is, for the original authors. Most BBC boards have HQs.

The Amstrad CPC series have a piece of BBSs recently brought out by Modem House.

There are some PO BBSs around for many computers and operating systems. These including ROS which is written in Turbo Pascal and therefore is transportable to a number of machines.

BBSs are being developed for the up market computers such as the ST and Amiga, and an ST package from Microdeal is now available.

To conclude, as I said above, contact sysops of boards running on your particular computer, most will be glad to help, advise, warn, etc. After all they've been through it all themselves.

Next, Brian Gaff has a problem with his VTX 5000. He says that when using a scrolling BB, it expects an instant reply from the modem, but the VTX is too slow.

Firstly, I am assuming that you have and are using Ascii software, not the viewdata stuff which is inside the modem. This problem should not really occur.

The best answer is probably to contact the manufacturer if you want to stick with the software rather than change it (I would be tempted to change the software or write my own). For the meantime, however, then I have three ideas that may be worth trying. As you have not named the software I can't guarantee that they're all equally relevant.

Firstly, you may get more success on boards that are only 1200/75 Ascii, not those that baud rate scan as this means that they need the carrier quickly, whereas a single baud rate will give you more time. Sometimes you may miss a board's carrier, but often as not it is from a weak line – try again and again.

If the above suggestion doesn't work then the modem may need servicing. Servicing a modem should give it a stronger and more responsive carrier.

Lastly, there may be a method of sending the carrier manually before it is needed. if you do this, the carrier should 'appear' at the right time.

Now on to a complaint. John Hey has written in to point out that in Communications, June 5, the column contained a couple of small errors.

Different parities

For a start, I said there are four main different parities. Why I said this when I (and just everyone who knows anything about comms) know there are six will have to remain a mystery. The ones I mentioned were Even, Odd, None, Ignore. Also, there are Mark and Space. The only two parities that the average comms enthusiast will use are None (BN1 format for Ascii boards) and Even (7E1 for Viewdata). The other four do get used but are not very common. I know of *no* services which use the Mark or Space parity, most software has no provision for them and many comms books omit to mention them. Thanks to Mr Hey for pointing this out, and I hope that this has not confused people too much.

Also on the subject of parity, I wrote ''the parity bit tells the computer how the Ascii code is made up'', Mr Hey writes, ''This is rubbish''. I find it neither rubbish nor even confusing in any way. It does just that. In case anyone else is confused on this point: with even parity selected, the Ascii code is made up of an even number of set bits (binary 1s). With no parity selected, the Ascii code is 8 bits long and may contain any number (up to 8 in total) of 1s or 0s.

Parity is a form of error checking and it error checks by telling the computer how the Ascii code should be made up (eg, even number of set bits) and if it does not consist of the correct number of set bits then the character has been incorrectly sent.

Start and stop bits

Lastly, the use of Start and Stop bits. I said that they are used to keep the computers synchronised. Mr Hey comments that the paragraph concerned was misleading and advised me to read ''a good text on datacomms''. I followed his advice and a short quote from *Hotline* (a pretty good datacomms book) is:

''Start and stop bits are extra bits which are added onto the beginning and end of each character before it is sent. They are used to keep the sending and receiving computers in synchronisation, and work in the following way.''

This is followed by a couple of pages of explanation into how start and stop bits are used.

This certainly applies in asynchronous communications but I think does not in synchronous communications (the latter you are unlikely to come in contact with). I hope this clarifies things for Mr Hey and anyone else who felt it was unclear.

Next week, Graham Edkins returns with an update on the Commodore network, Compunet.

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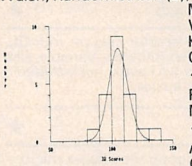

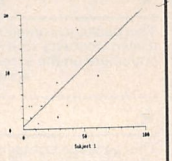

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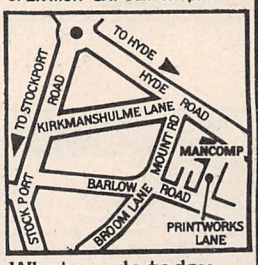

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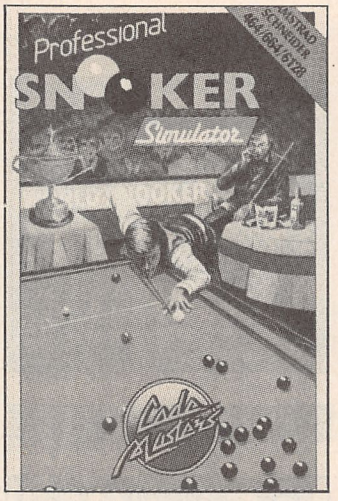
New Releases

John Cook looks through this week's new arrivals

Amstrad CPC

Program *Professional Snooker Simulator* **Type** Arcade Simulation **Micro** Amstrad CPC **Price** £1.99 **Supplier** Code Masters, 1 Beaumont Business Centre, Beaumont Close, Banbury, Oxon OX16 7RT.

Code Masters with its second wave of budget releases, this one written by a gent named Godwin Graham BSc. (I think the BSc means that he cuts up hamsters and wears a white coat in the bath.)



However, rest assured that this particular game is certainly comparable to the other Snooker title on the market at the moment – with the added advantage of being quite a bit cheaper.

Program *SAS Assault Course* **Type** Arcade **Micro** Amstrad CPC **Price** £1.99 **Supplier** Atlantis Software, 28 Station Road, London SE25 5AG.

Program *Escape from Khoshima* **Type** Adventure **Micro** Amstrad CPC **Price** £1.99 **Supplier** Atlantis Software, 28 Station Road, London SE25 5AG.

Program *Bridge* **Type** Strategy **Micro** Amstrad CPC **Price** £12.95 (tape) £15.95 (disc) **Supplier** Infogrames, Mitre House, Abbey Road, Enfield, Middlesex EN1 2RQ.

Program *Palitron* **Type** Arcade Adventure **Micro** Amstrad CPC **Price** £8.95 (tape) £14.95 (disc) **Supplier** The Edge, 36/38 Southampton Street, Covent Garden, London WC2E 7HE.

Program *Super Robin Wood* **Type** Arcade **Micro** Amstrad CPC **Price** £1.99 **Supplier** Code Masters, 1 Beaumont Business Centre, Beaumont Close, Banbury, Oxon OX16 7RT.

Program *Vampire* **Type** Arcade **Micro** Amstrad CPC **Price** £1.99 **Supplier** Code Masters, 1 Beaumont Business Centre, Beaumont Close, Banbury, Oxon OX16 7RT.

Atari

Program *Tomahawk* **Type** Simulation **Micro** Atari **Price** £9.95 (tape) £14.95 (disc) **Supplier** Digital Integration, Watchmoor Trade Centre, Watchmoor Road, Camberley, Surrey GU15 3AJ.

Excellent conversion of Digital Integration's already successful chopper simulation.

BBC/Electron

Program *Dunjunz* **Type** Arcade Adventure **Micro** BBC B **Price** £2.99 **Supplier** Bug Byte, Argus Press Software, Victory House, Leicester Place, London WC2H 7NB.

I don't suppose anyone ever expected *Gauntlet* to arrive on the BBC. Errr – in fact it still hasn't, but I'd guess that *Dunjunz* is the best you can do at the moment.

Up to four friends (and with all of you huddled round that keyboard, you'd have to be) can play at once, each with their own display taking up a quarter of the screen. Not bad.

Program *Ravage* **Type** Arcade **Micro** Electron **Price** £1.99 **Supplier** Blue Ribbon Software, CDS House, Beckett Road, Doncaster DN2 4AD.

Program *Joey* **Type** Arcade **Micro** Electron **Price** £1.99

Supplier Blue Ribbon Software, CDS House, Beckett Road, Doncaster DN2 4AD.

Program *Darts* **Type** Arcade/Simulation **Micro** Electron **Price** £1.99 **Supplier** Blue Ribbon Software, CDS House, Beckett Road, Doncaster DN2 4AD.

Program *Bar Billiards* **Type** Arcade/Simulation **Micro** BBC/Electron **Price** £1.99 **Supplier** Blue Ribbon Software, CDS House, Beckett Road, Doncaster DN2 4AD.

Program *Condition Red* **Type** Arcade **Micro** BBC/Electron **Price** £1.99 **Supplier** Blue Ribbon Software, CDS House, Beckett Road, Doncaster DN2 4AD.

C16/Plus 4

Program *Astro Plumber* **Type** Arcade **Micro** C16/Plus 4 **Price** £1.99 **Supplier** Blue Ribbon Software, CDS House, Beckett Road, Doncaster DN2 4AD.

Program *Joey* **Type** Arcade **Micro** C16/Plus 4 **Price** £1.99 **Supplier** Blue Ribbon Software, CDS House, Beckett Road, Doncaster DN2 4AD.

Program *Diamond Mine* **Type** Arcade **Micro** C16/Plus 4 **Price** £1.99 **Supplier** Blue Ribbon Software, CDS House, Beckett Road, Doncaster DN2 4AD.

Program *Diamond Mine II* **Type** Arcade **Micro** C16/Plus 4 **Price** £1.99 **Supplier** Blue Ribbon Software, CDS House, Beckett Road, Doncaster DN2 4AD.

Commodore 64

Program *Falcon Patrol II* **Type** Arcade **Micro** Commodore 64 **Price** £2.99 **Supplier** Bug Byte, Argus Press Software, Victory House, Leicester Place, London WC2H 7NB.

Program *Blood 'n Guts* **Type** Arcade Sports Simulation **Micro** Commodore 64 **Price** £9.95 (tape) £14.95 (disc) **Supplier** American Action.

We were all really looking forward to this one. "An ancient barbarian decathlon with all the violence and brutality you've ever dreamed about in a computer game," they said.

We always assumed American Action were playing it for laughs (like they were with *1943 – One Year After,* only this time deliberately funny) and they are.

Blood 'n Guts is a joystick waggler set in days gone by when men were men and women all wore off the shoulder designer mammoth skins – just like Raquel Welch did in *Two Million Years BC.*

Although the graphic backgrounds look pretty, the main sprites are not that good and far too small. Many of the events are derivative of all the other *Decathlon* style games you might have (Cat Throwing is like Discus or Hammer Throw for instance).

Still, it does show some originality and most of all, large helpings of humour. And anyone with a weak stomach can be assured there is nothing to worry about here . . . which is more than can be said for Anco's *Thai Boxing.* Yuk.

Program *Tomahawk* **Type** Simulation **Micro** Commodore 64 **Price** £9.95 (tape) £14.95 (cassette) **Supplier** Digital Integration, Watchmoor Trade Centre, Watchmoor Road, Camberley, Surrey GU15 3AJ.

Spectrum

Program *Falcon Patrol II* **Type** Arcade **Micro** Spectrum **Price** £9.99 **Supplier** Bug Byte, Argus Press Software, Victory House, Leicester Place, London WC2H 7NB.

Re-release of an old Virgin goodie under the Bug Byte flag. Zap away to your heart's content.

Program *Firepower* **Type** Arcade **Micro** Spectrum **Price** £1.50 **Supplier** Armadillosoft, 31 Marford Hill, Marford, Wrexham, Clwyd LL12 8SW.

There are a number of parallels between the music biz and our own – one of which is that in both, punters can throw something together on a cassette, design and inlay, and attempt to put it on the market. Very enterprising it is too.

Usually it is the weird or offbeat material that gets to see the light of day like this – stuff an established label wouldn't take on. We welcome such efforts and when they come our way we do our best to give advice and help when we can. Unfortunately, *Firepower* is neither weird nor offbeat.

In musical terms, this program would be classed as out of tune Duran Duran, no – make that Culture Club – as it is a not-very-well executed variation on *Jet Pac.*

Something your Mum would be proud of if you programmed it, I grant you, but asking for money is return for this length of magnetic tape is going a bit far.

Not even bad enough to raise a giggle, I applaud the effort involved but respectfully suggest they invest in an imagination and a compiler.

Program *Station 9-Zero Under Attack* **Type** Adventure **Micro** Spectrum **Price** £3.00 **Supplier** Armadillosoft, 31 Marford Hill, Marford, Wrexham, Clwyd.

Program *League Challenge* **Type** Football Management **Micro** Spectrum **Price** £1.99 **Supplier** Atlantis Software, 28 Station Road, London SE25 5AG.

Program *Nuclear Countdown* **Type** Arcade Adventure **Micro** Spectrum **Price** £1.99 **Supplier** Atlantis Software, 28 Station Road, London SE25 5AG.

Program *BMX Simulator* **Type** Arcade **Micro** Spectrum **Price** £1.99 **Supplier** Code Masters, 1 Beaumont Business Centre, Beaumont Close, Banbury, Oxon OX16 7RT.

Program *Landfall on Rollus* **Type** Adventure **Micro** Spectrum **Price** £2.99 **Supplier** Clwyd Adventure Software, 14 Snowdon Avenue, Bryn-y-Ball, Mold, Clwyd CH7 6SZ.

Program *Professional Snooker Simulator* **Type** Arcade Simulation **Micro** Spectrum **Price** £1.99 **Supplier** Code Masters, 1 Beaumont Business Centre, Beaumont Close, Banbury, Oxon OX16 7RT.

Pick of the week

Armour CPC

Program *The Sacred Armour of Antiriad* **Type** Arcade Adventure **Micro** Amstrad CPC **Price** £8.99 (tape), £12.99 (disc) **Supplier** Palace Software, 275 Pentonville Road, London N1 9NL.

There's something about the CPC machines that makes them particularly good at running arcade adventures, the best example of which is, at the present time, *Heartland* from Odin. But *Antiriad* certainly runs it a close second.

Already released on Spectrum and Commodore 64, it was largely overlooked in the Christmas rush of titles, so maybe its launch on the Amstrad will give it a new, well deserved, lease of life.

Designed by comic book artist Dan Malone and programmed on this format by Andrew Fitter, it's a variation on the 'last of the race' scam set in a post-nuclear war world, but this time you must zap the oppressor aliens by activating the Sacred Armour (actually a dead Rad-Suit). Unfortunately, the pre-holocaust scientists forgot to use Duracell in the thing, as well as scattering the optional extras around the place – your first task is to get it functioning.

Beautiful graphics, neat design and gamesplay make this one for any arcade adventurer's collection.

Let's hear it for Commodore

The Commodore 64 is mercilessly slated for its wanting basic, its incredibly slow disc drive and the poor print quality of the dedicated MPS 801 printer. Whenever anyone draws up a 'buyer's guide' to the micro market the 64 is usually missing – deemed outdated, limited and rather poor, and yet, in spite of the quantum leaps recently made in popular home/business micros by Amstrad and the vain attempts of the rest of the industry to catch up, the old C64 remains an excellent choice for the person perusing the home micro market.

It seems incredible that a company the size of Commodore should consider it worthwhile to continue to market an 8-bit 64K computer when all its competitors are either opting for 256K Ram and bank switching or going the whole hog and launching 16-bit machines – yet there is method in Commodore's apparent madness.

Examine the company's strategy as a whole: it has the Amiga – the rather highly priced micro computer which comes closest to the dream of an 'intelligent' micro; it has the 128, which is cheaper and serves both home user in 64 mode and business user in the 128 and CPM modes. Then it has the sub-£200 64 – the best selling micro world-wide ever.

The three computers between them have appeal to all manner of users, giving Commodore a shot at any potential micro user.

Owners of other micros might sneer or even snigger, but in my opinion the C64 is a perfectly adequate machine for many commercial purposes, more so in the light of recent add-ons. My own 64 was purchased for the sole purpose of word-processing, in my business as a magazine editor and just a few months after the purchase was made the prices of other micros tumbled, leaving me wondering why I paid £550 for a 64, 1541 disc drive and MPS801 printer when I could have built a Sinclair QL outfit for a fraction of the price. Later, when Amstrad, the darlings of the computer press, launched the 8256, I again seriously questioned the wisdom of my purchase. Yet, again and again, the C64 keeps emerging tops for the purpose in hand.

The solid construction of the keyboard (mine has absorbed several million key depressions without so much as a hiccup) puts the 64 head and shoulders above much of the competition – an early report on the Amstrad 8256 stated that the keys rattled 'dementedly'. Perhaps the Amstrad is aimed at the end user who will scrap the unit and buy another if anything goes wrong with it – certainly a failure in any link of that system leaves the whole fairly useless if it's to be sent away for repair.

Around the robust keyboard of the Commodore it is now possible to attach a fabulous number of pieces of hardware. The first of the recent generation of add-ons were cartridge-based fast loaders.

These cartridges began to incorporate other features, slowly at first, but then with ever-gathering momentum. Then *The Final Cartridge* arrived, offering a complete external operating system for the 64, and a host of other features which made the 64 into an altogether different machine.

Now there are two printer buffers on offer from Dimension Computers, one 32K and one 64K Ram, a great boon to a journalist who might be pressed for time. Arguably even more useful is Dolphin DOS from Evesham Micros – two circuit boards which fit into the 64 and the 1541 disc drive to convert from serial to parallel communications, which brings the 1541 speed to levels previously only enjoyed by users of other computers.

Where will the Commodore add-on boom end – if at all?

The only certain thing is that, at a time when pundits were writing off the 64, Commodore gave the computer world's version of immortality by bringing out the 64C. Thus a micro which is already four years old will be around for some time to come, allowing the software houses and add-on manufacturers to produce even more goodies.

Jim Tyler

NEXT WEEK

Beginner's Guide to Computing

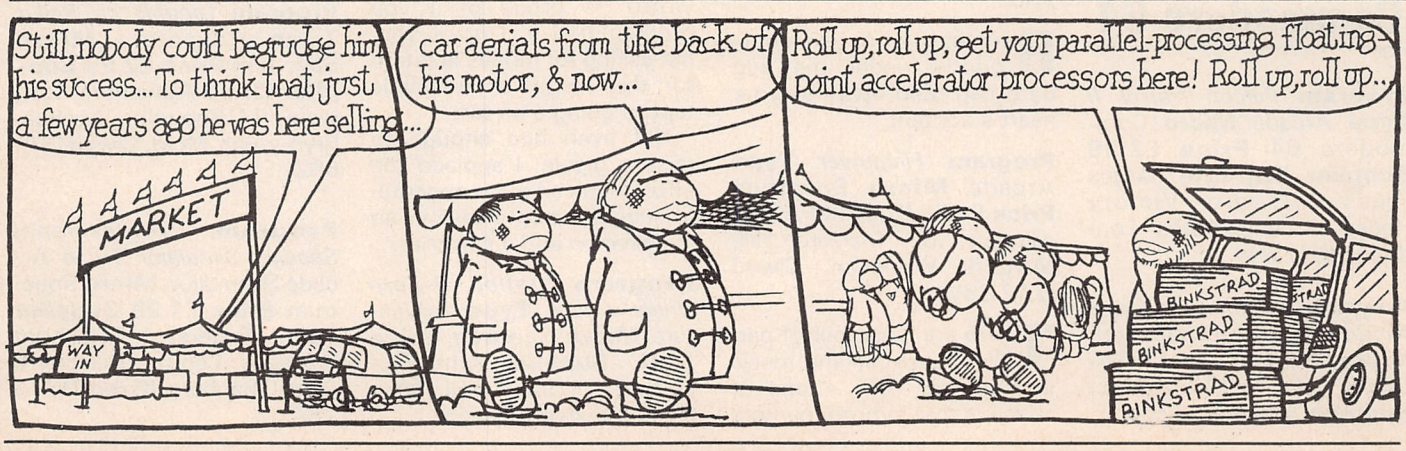
Part Two of our four part complete guide to getting to grips with computing includes the next instalment of the introduction to Basic principles and programming.

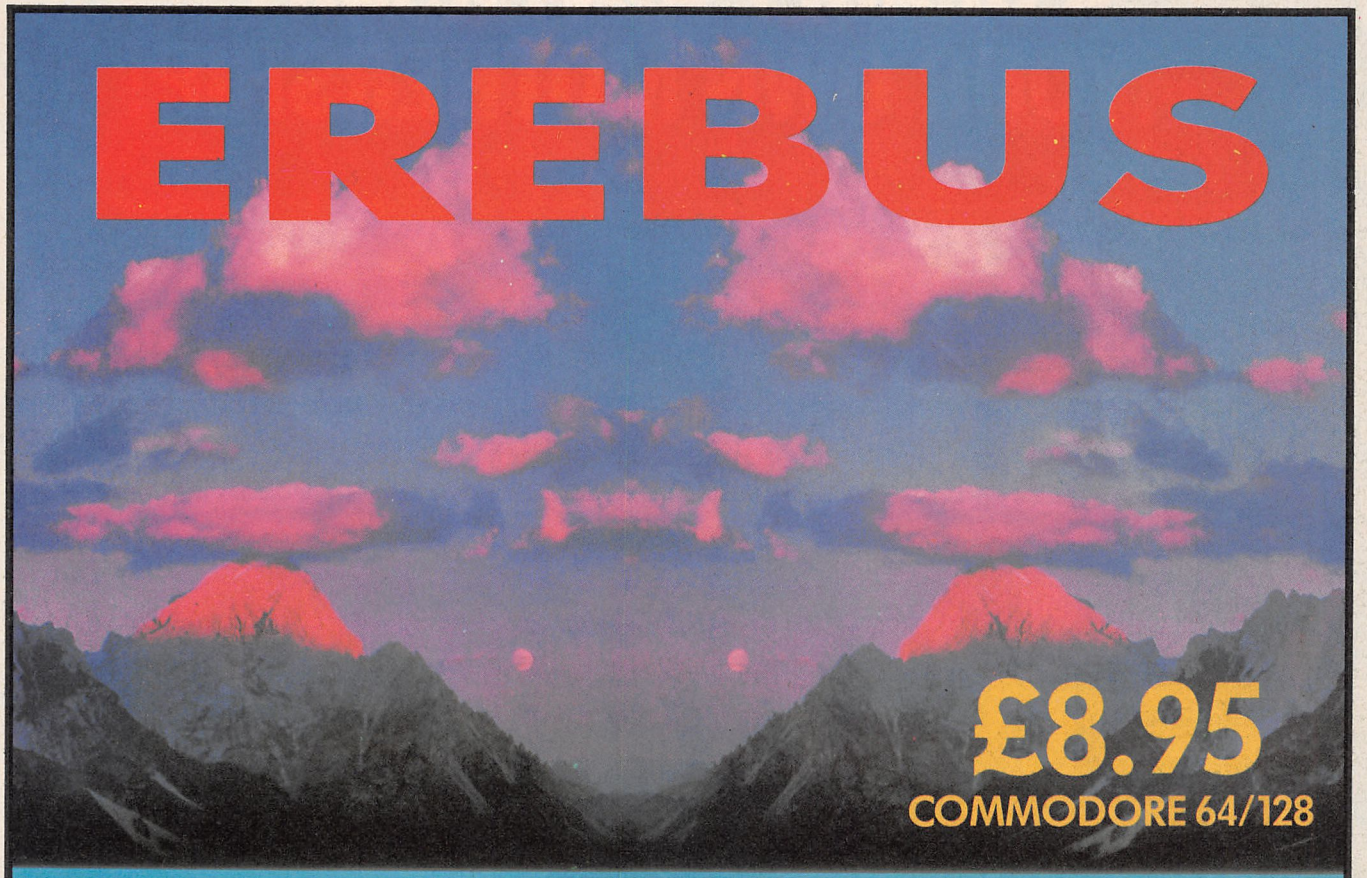
Plus, all you need to know to start making music on your micro; a guide to printers – how to use them and what types are available – and an introduction to CP/M, the ten year old industry standard currently enjoying a renaissance, thanks to its inclusion in many Z80-based home micros.

Superbowl Special

Get out your popcorn and pompoms – *Popular* is getting into the American Football spirit.

With a full round-up of all the American Football computer games on the market – and an exclusive gridiron game listing for Spectrum owners to type in – not to mention the ten American Football yearbooks which are waiting to be won in our special competition, next week's *Popular* is *the* essential accessory at any Superbowl party this year.





This smooth scrolling blast-'em game features the very best in fast arcade action by Steve Lee *(author of the Falcon Patrol series and Shogun)* with stunning graphics by Martin Wheeler *(famous for Spectrum Dan Dare and the original designer of Sorcery)*. It is a multi-sectioned game with many varieties of tough aliens to eliminate. You must fight through each wave in your highly manoeuvrable spherical space fighter and save Earth from the horrible fate of the noxious nerve gas being produced on planet Erebus.

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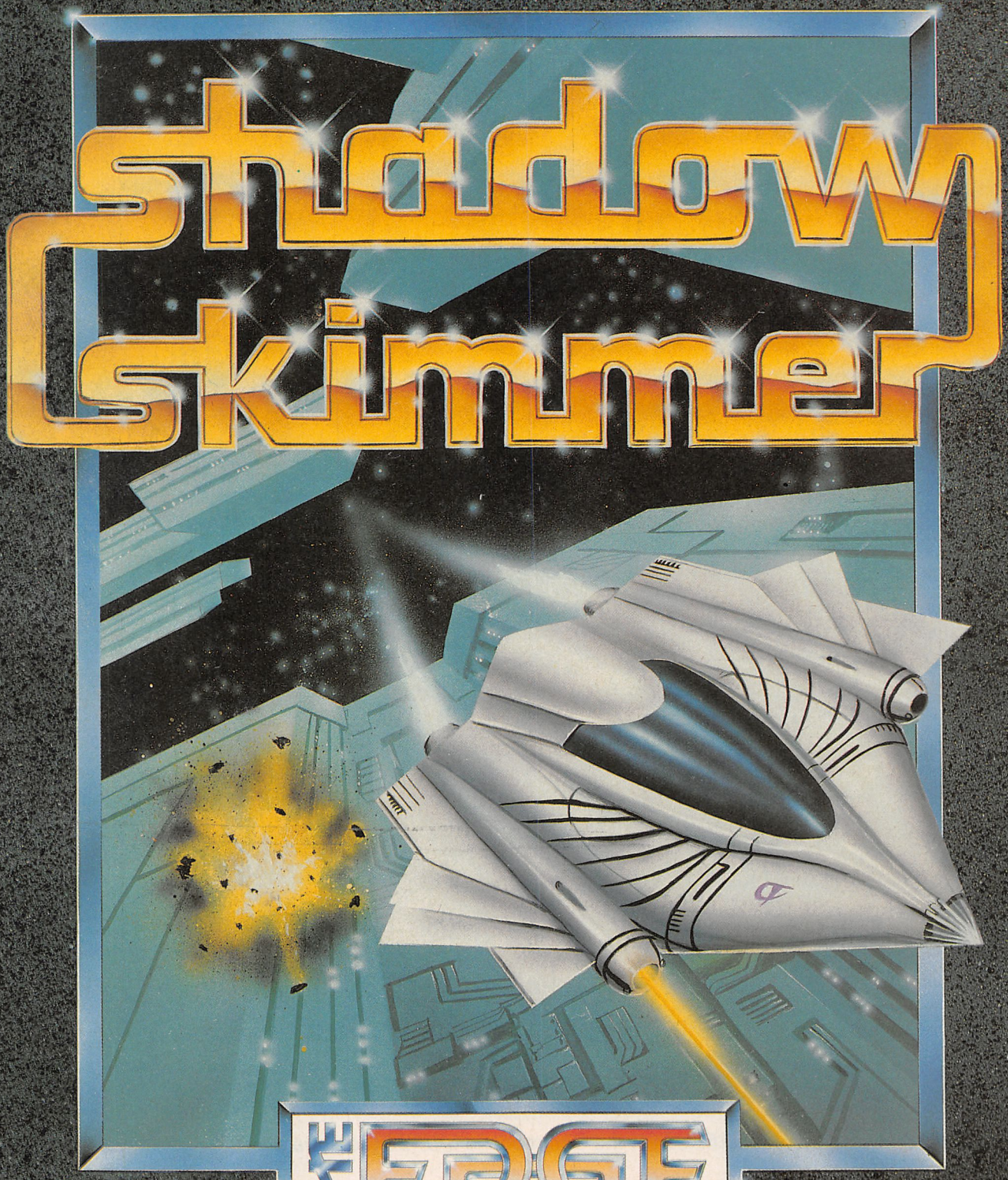

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